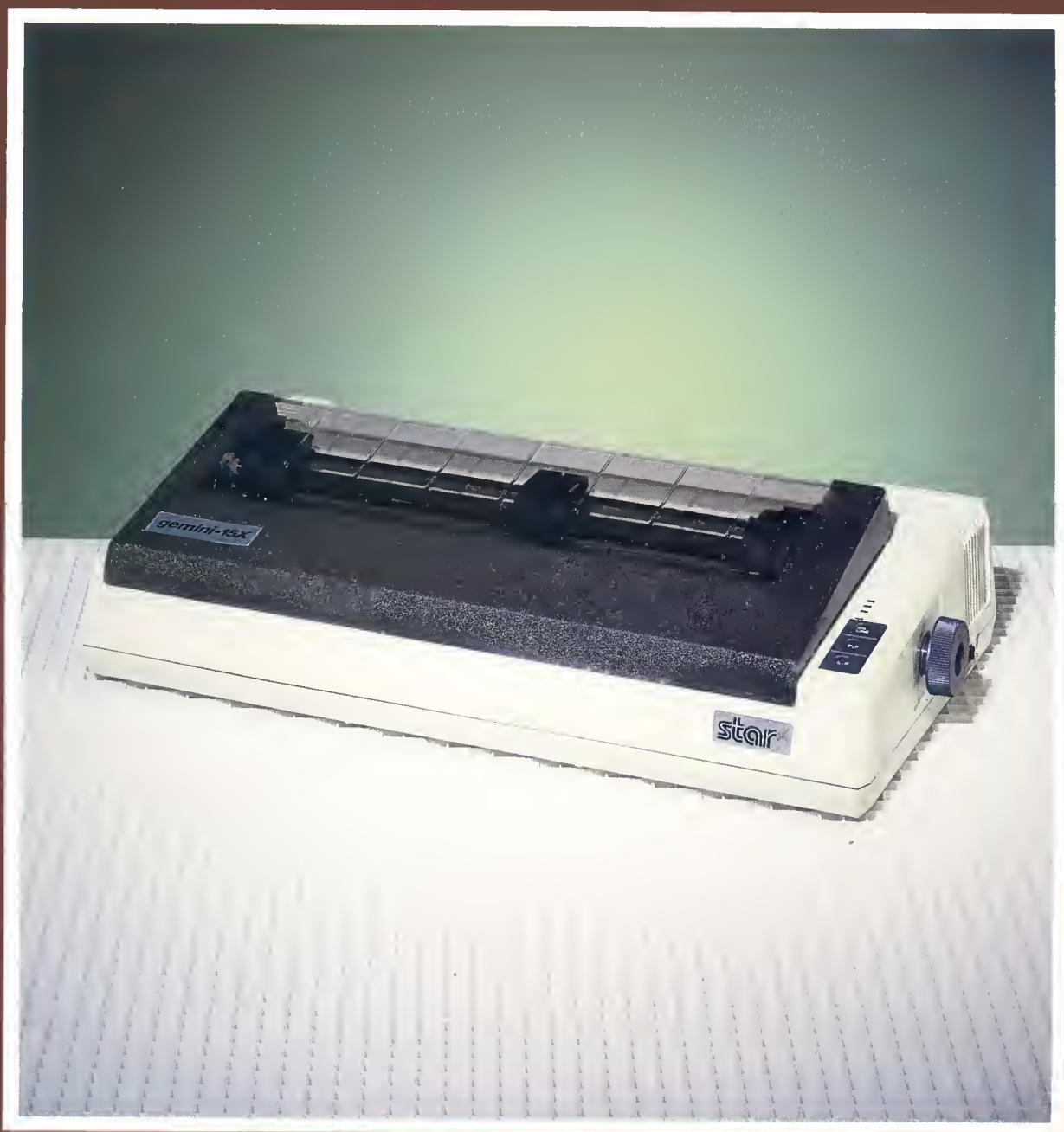


# PRINTER: STAR® MODEL GEMINI-15X



TECHNICAL SERVICE DATA FOR YOUR PRINTER

## PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Printer malfunctions.

Check all interconnecting cables for good connection and correct hookup before making service checks.

Replacement or repair of CPU board or connectors may be necessary after the malfunction has been isolated.

## TEST EQUIPMENT AND TOOLS

### TEST EQUIPMENT

Digital Volt/Ohm Meter  
Scope  
Logic Probe

### TOOLS

Phillips Screwdriver  
Small Screwdriver  
Low Voltage Soldering Iron

## REPLACEMENT PARTS AND DESCRIPTIONS

ITEM NO.	PART NO.	DESCRIPTION
BD1, BD2	08990202	Bridge Rectifier, KBL02
F1	09990020	Fuse, 1.25A @125V, Time Lag
IC1B		5.0V Regulator, AN7805
M1	87041011	Carriage Motor
M2	87041020	Paper Feed Motor
M3	89070010	Print Head
M4		Home Position Detector, ON1112
P1		Power Cord, AC
S1		Switch, AC Power
SW1	87055041	Switch, Paper Out Detector, Bottom
SW1A	09010024	Switch, On-Line, J-P5029
SW2	87055041	Switch, Paper Out Detector, Back
SW3	87059040	Switch, Right-End Detector
T1		Transformer, Power, 40851A.
TA1, TA2	07650003	Transistor Array, PU4124
TR1B	07312771	24V Regulator, D1277
	87232032	Control Logic Board
	87220320	Control Panel Board
	87055010	Head Cable Board
		AC Filter Board (Part of Power Supply Unit)
		Power Supply Unit

## PRELIMINARY SERVICE CHECKS (Continued)

### SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

**NOTE:** Turn the power Off before replacing any parts or connecting or disconnecting any connectors.

#### ① PRINTER DEAD

- (A) If the power light is not On, check AC Fuse (F1). If Fuse is open, replace it and turn On power again.
- (B) If Fuse F1 opens again, disconnect Connectors CN9 and CN10, replace the Fuse and turn power On. If the fuse opens again, replace Power Supply Unit.
- (C) If Fuse F1 does not open, reconnect Connector CN9 and CN10, disconnect Connectors CN17, CN11 and CN12 and turn power On. If the fuse opens, replace Power Regulator Board.
- (D) If Fuse F1 does not open, reconnect CN11 and turn power On. If the fuse opens, disconnect Connectors CN4, CN5, CN6, CN7 and CN8 from the Control Logic Board, replace fuse and turn power On. If the fuse opens, replace the Control Logic Board.
- (E) If Fuse F1 does not open, reconnect CN8 and turn power On. If the fuse opens again, replace the Control Panel Board.
- (F) If Fuse F1 does not open, remove the head cable, connect CN17, CN12 and CN7 and turn power On. If the fuse opens again, replace the Head Cable Board or the Control Logic Board.
- (G) If Fuse does not open, reconnect the head cable and turn power On. If the fuse opens, replace the Print Head (M3).
- (H) If Fuse F1 does not open, reconnect CN6 and turn power On. If the fuse opens, check and replace Carriage Motor (M1).
- (K) If Fuse F1 does not open, reconnect CN5 and turn power On. If the fuse opens, check and replace Paper Feed Motor (M2).
- (L) If Fuse F1 does not open, reconnect CN4 and turn power On. If the fuse opens, check Home Position Detector (M4), Paper Out Detector Switches (SW1, SW2) and the Right-End Detector Switch (SW3).

#### ② PRINTER CARRIAGE ASSEMBLY DOES NOT MOVE

- (A) Check Connector CN6 for good connection.
- (B) Disconnect Connector CN6 and check for 10.6 ohms between pins 2 and 3, pins 2 and 4, pins 1 and 5 and pins 1 and 6 of the connector.

- (C) Check for 25.0V at the emitter of Transistor TR1B. If the voltage is missing, check the Power Regulator Board.

- (D) Check for shorted Right-End Detector Switch (SW3).

#### ③ PRINT HEAD WILL NOT PRINT

- (A) Check Connector CN7 for good connection.
- (B) Check for a defective Head Cable Board or cracked head cable.
- (C) Check for a defective Print Head (M3).

#### ④ MISSING DOTS IN THE PRINT PATTERN

- (A) Check Connector CN7 for good connection.
- (B) Disconnect Connector CN7 and check the resistances of the Print Head solenoids. Measure between pins 6 and 1 thru 5 and between pins 6 and 7, 8, 10, 12. Each of the solenoids should measure about 7.8 ohms.

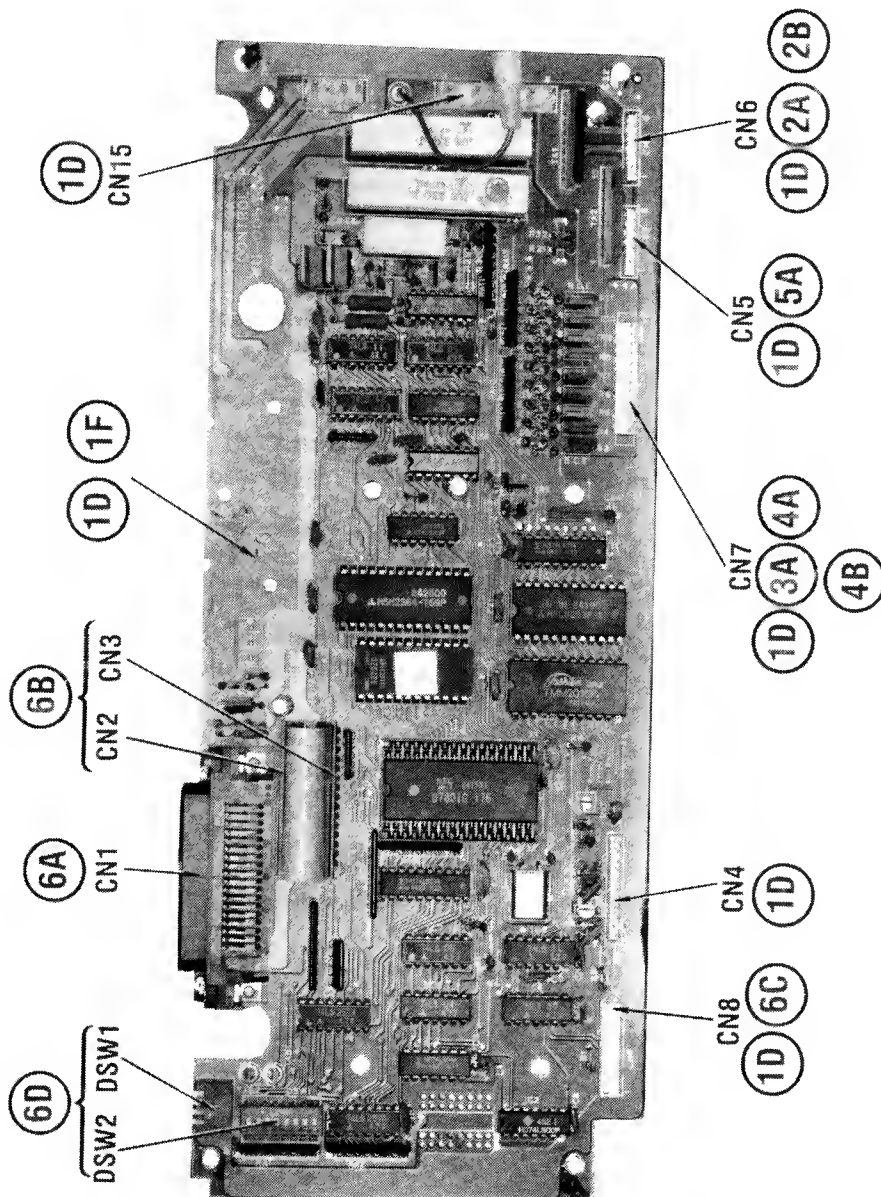
#### ⑤ LINE FEED WILL NOT OPERATE

- (A) Check Connector CN5 for good connection.
- (B) If the Paper Feed Motor (M2) turns and the paper does not advance when the L.F. button is pressed, check the operation of the gear assembly on the right-hand side of the platen.
- (C) If the Paper Feed Motor is inoperative, check the resistances of the windings of the Paper Feed Motor. Disconnect Connector CN5 and check for 50.6 ohms between pins 2 and 5, pins 2 and 6, pins 1 and 3 and pins 1 and 4. If the resistances of the windings are abnormal, replace the Paper Feed Motor.

#### ⑥ PRINTER WILL NOT RECEIVE DATA FROM HOST COMPUTER

- (A) Check the interface cable between the host Computer and the Printer. Also check Connector CN1 for good connections.
- (B) Check the cable connector between Connectors CN2 and CN3 on the Control Logic Board for good condition and connection.
- (C) Check the operation of the On-Line Switch (SW1A). If the On-Line status does not change by pressing the On-Line Switch, check for good connection at Connectors CN8 and CN1A or bad Control Panel Board.
- (D) Check the settings of DIP Switches DSW1 and DSW2.

## PRELIMINARY SERVICE CHECKS (Continued)

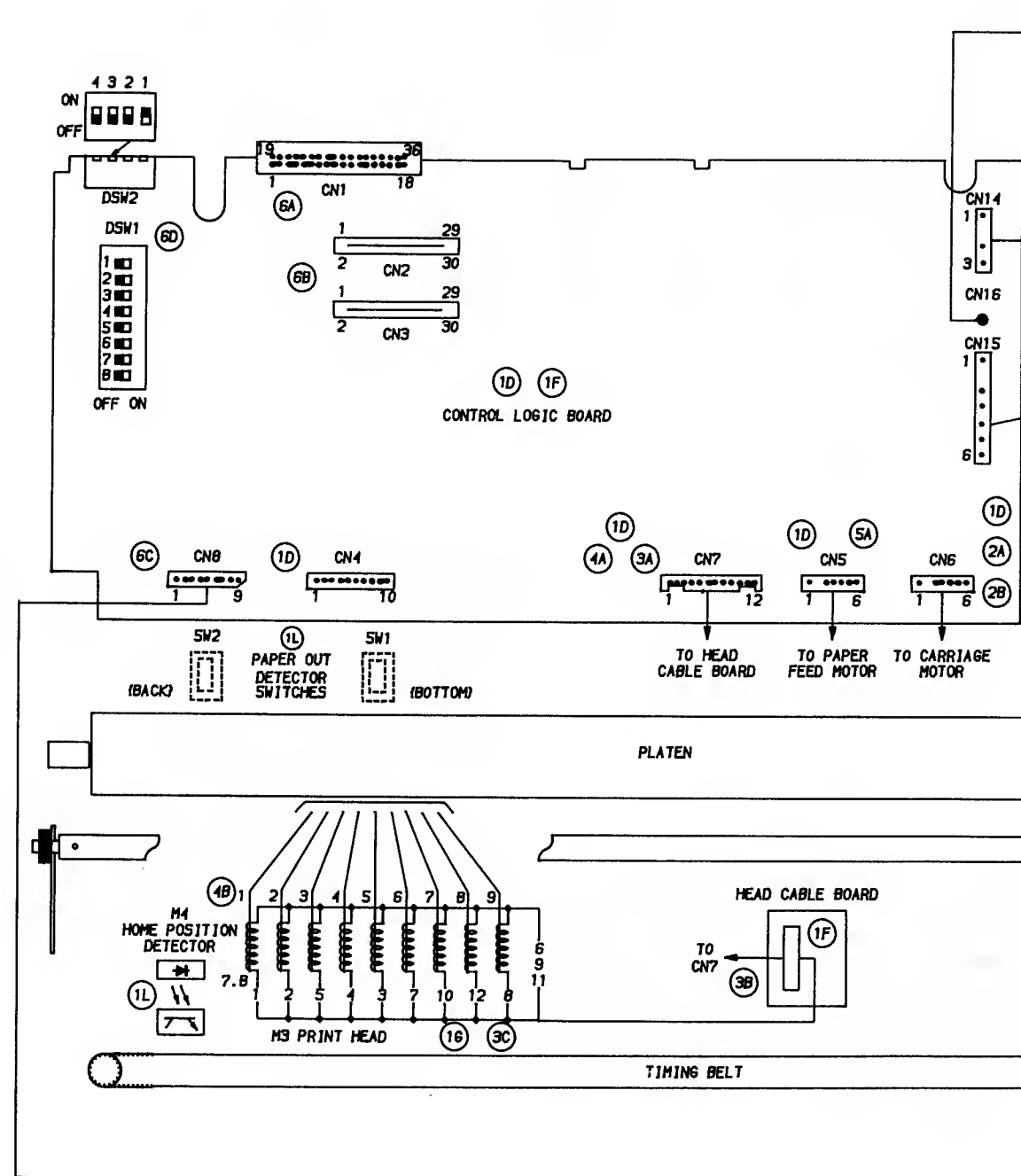


CONTROL LOGIC BOARD

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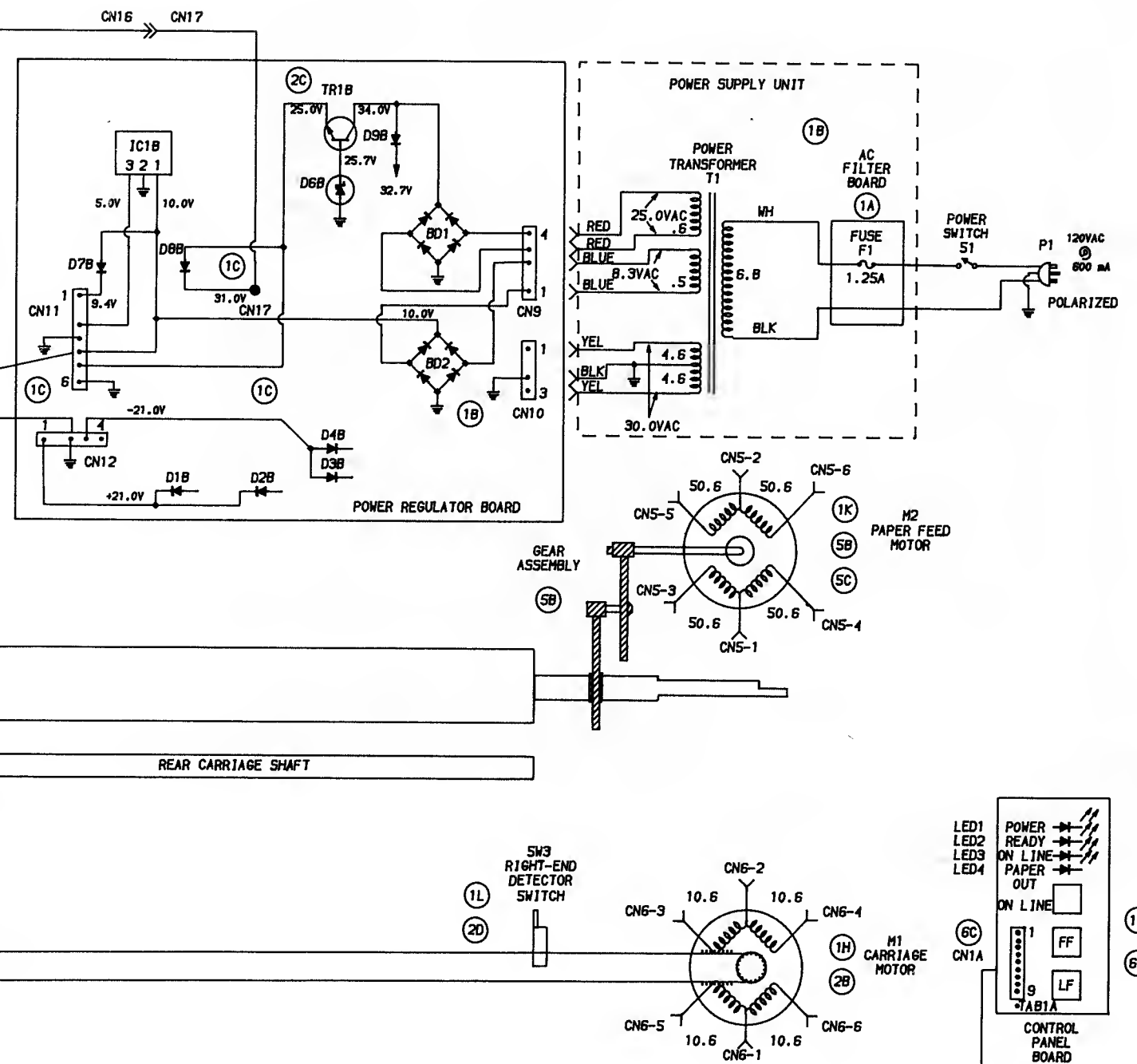


### PRELIMINARY SERVICE CHECKS (Continued)



### INTERCONNECTING DIAGRAM

### PRELIMINARY SERVICE CHECKS (Continued)



### INTERCONNECTING DIAGRAM

# PRELIMINARY SERVICE CHECKS (Continued)

## GENERAL OPERATING INSTRUCTIONS

### PRINTER SELF-TEST

To use the built-in self-test function, put paper into the Printer and hold down the LF (Line Feed) button while turning the Printer On.

When the Printer is turned On, it is "On-Line". pressing the "On-Line" button changes the status of the Printer from "On-Line" to "Off-Line". When the Printer is "On-Line", the Ready light and "On-Line" light will be On. These lights will turn Off when the status of the Printer changes to "Off-Line".

### DIP SWITCHES

It is necessary to remove Upper Case for access to DIP Switch 1. Access to DIP Switch 2 is at the rear of the Printer.

SW1-1 sets selection of character set. Standard setting is On. See Character Set Table.

SW1-2 sets selection of print mode. For Normal print mode set SW1-2 to On. For Emphasized print mode set SW1-2 to Off.

SW1-3 sets selection of print pitch. For 10 CPI (character per inch) set SW1-3 to On position. For 17 CPI (character per inch) set SW1-3 to Off position.

SW1-4 sets selection of character set. Standard setting is On. See Character Set Table.

### CHARACTER SET TABLE

CHARACTER SET	SW1-1	SW1-4
STANDARD ASCII	On	On
DOWN LOAD	On	Off
ITALIC ASCII	Off	On
ITALIC DOWN LOAD	Off	Off

SW1-5 sets selection of line feed value. For 1/6 inch setting of line feed set SW1-5 to On position. For 1/8 inch setting of line feed set SW1-5 to Off position.

SW1-6, SW1-7 and SW1-8 set selection of International Character Set and form length. See International Character Set Table.

### INTERNATIONAL CHARACTER SET TABLE

COUNTRY	SW1-6	SW1-7	SW1-8	Form Length
USA	On	On	On	11 inches
England	Off	On	On	11 inches
Germany	On	Off	On	12 inches
France	On	On	Off	12 inches
Denmark	Off	Off	On	12 inches
Sweden	Off	On	Off	12 inches
Italy	On	Off	Off	12 inches
Spain	Off	Off	Off	12 inches

SW2-1 sets the selection of paper out sensor. If SW2-1 is set to On position (standard setting), the Printer is disabled when out of paper, and sends the signal to the host Computer to stop sending more information. If SW2-1 is set to Off position, the Printer is allowed to print without paper in the unit.

SW2-2 sets the selection of the buffer or CR. If SW2-2 is set to On position, CR code is ignored and print data of one line is stored in the buffer until memory is full or by input of LF code. If SW2-2 is set to Off position, printing is performed everytime CR code is input (standard setting).

SW2-3 sets the selection of 7 or 8 Bit interface selection. If SW2-3 is set to On position, interface is set to 7 bits. If SW2-3 is set to Off position, interface is set to 8 bits (standard setting).

SW2-4 sets the Printer auto line feed On or Off. Note that SW2-2 overrides SW2-4. If SW2-4 is set to On position auto line feed is performed by CR code. If SW2-4 is set to Off position auto line feed is not performed by input of CR code (standard setting).

# PRELIMINARY SERVICE CHECKS (Continued)

## MISCELLANEOUS ADJUSTMENTS

### PRINT HEAD TO PLATEN GAP ADJUSTMENT

Place the Platen Adjust Lever at the second step position (handle straight up). Insert a feeler gauge between the ribbon guide and the platen. The gap should measure between 0.25mm and 0.35mm. Check the gap with the Print Head at the left, center and right of platen for uniformity.

If the platen gap is out of tolerance, the following adjustment is required.

Move the Platen Adjust Lever all the way forward until adjust bush hole lines up with frame hole. Fasten the left and right adjust bushes with an (M3 x 6) screw into left and right frame tap holes. Remove nut and lock washer holding adjust lever. If the gap is too wide place the adjust lever on point A or B. See Figure 1. If gap is too narrow place the adjust lever on point C or D. See Figure 1. Retighten nut on adjust lever and remove the two retaining screws from tap holes. Check gap measurement.

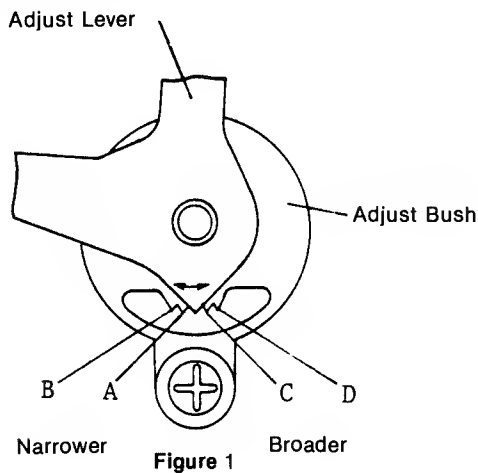


Figure 1

### CARRIAGE POSITION ADJUSTMENT (HOME POSITION)

Turn the Printer On. The Carriage will move to the left and stop. Measure the gap between the adjust bush and the Carriage. It should be between 1 and 2mm. See Figure 2. To adjust, loosen the screw on the Home Position Detector Board. Pivot the board either left or right depending if the gap is too wide or too narrow. To check the adjustment turn the Printer On and measure the gap. Repeat the procedure until gap setting is correct.

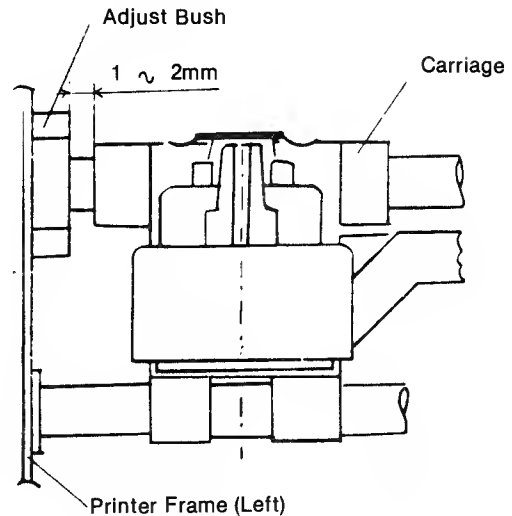


Figure 2

### RIGHT-END DETECTOR ADJUSTMENT

If the Right-End Detector Switch is not closing when the Carriage Assembly is moved to the far right, adjustment is required. Remove the ink ribbon spools. Remove two pins holding Ribbon Base Assembly and remove assembly. Slide Carriage Assembly to far right. Loosen screw in slotted hole of detector switch. Pivot switch until it just closes and tighten screw.

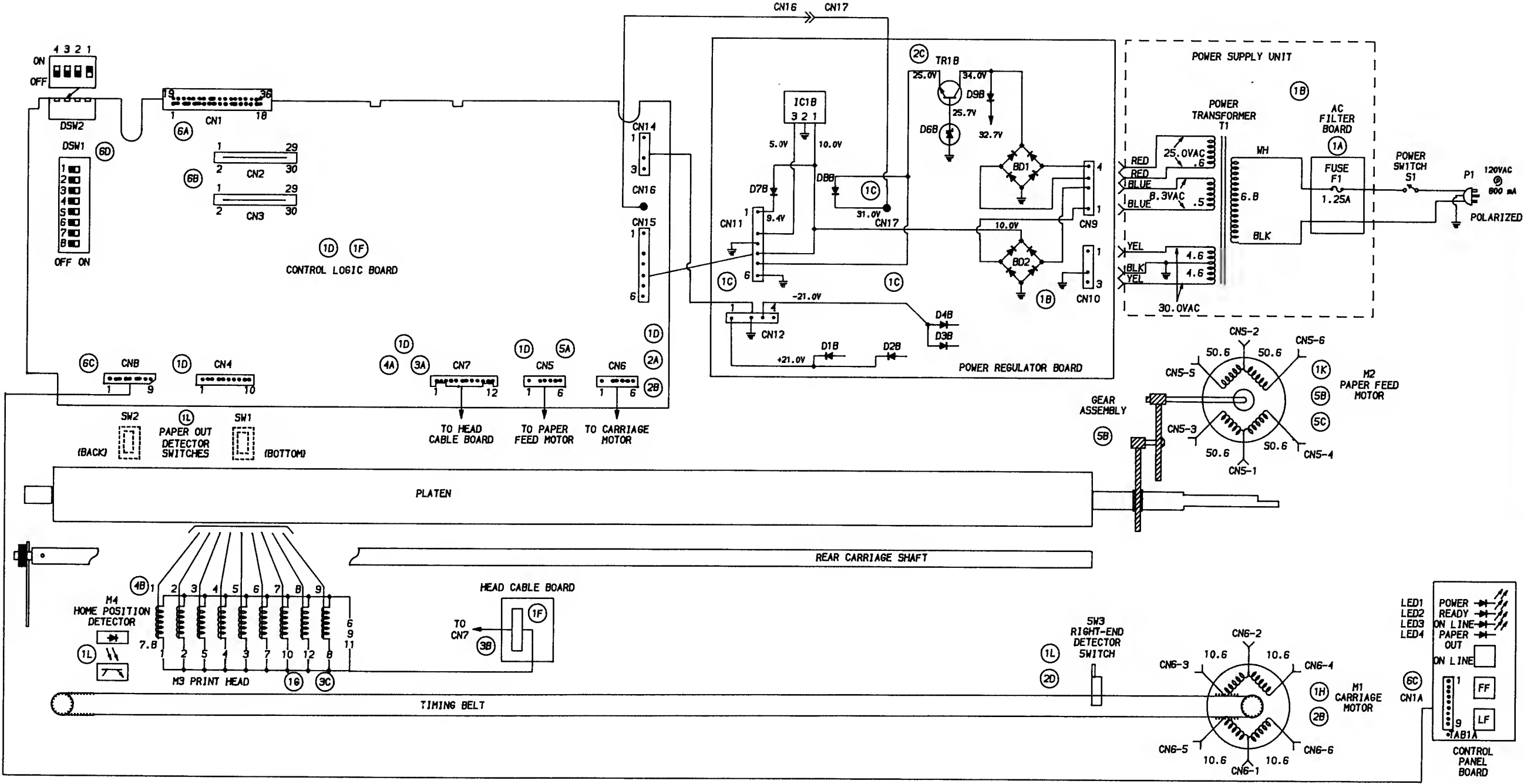
### TIMING BELT TENSION ADJUSTMENT

Slide Carriage Assembly to far right. Locate left timing belt pulley Adjusting Plate. Loosen screw in slotted hole of Adjusting Plate. Adjust belt tension for 30 grams  $\pm$  10%. Adjustment is made by pushing the pulley to the left until proper tension is obtained. If adjustment cannot be made within tolerance, replacement of timing belt is required. See Timing Belt Removal. Tighten screw and apply screw lock.

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PRELIMINARY SERVICE CHECKS (Continued)



# PRELIMINARY SERVICE CHECKS (Continued)

## DISASSEMBLY INSTRUCTIONS

### UPPER CASE REMOVAL

Remove the brown plastic Printer cover. Remove the platen knob. Remove three Phillips screws that fasten the upper case to the lower case. Pry forward three tabs at the front edge of the upper case, then carefully lift the upper case. Disconnect the Control Panel Board connector and the ground wire. Remove the upper case from the Printer.

### CONTROL PANEL BOARD REMOVAL

Remove the upper case. See "Upper Case Removal". Then remove two Phillips screws fastening the Control Panel Board to the upper case. Remove Control Panel Board.

### CONTROL LOGIC BOARD REMOVAL

Remove the upper case. See "Upper Case Removal". Disconnect the ground connectors, the Power Supply Board connectors and the connectors to the Printer Mechanism and the Control Panel Board. Remove 5 screws fastening the Control Logic Board. Remove the Control Logic Board from the Printer.

### POWER REGULATOR BOARD REMOVAL

Remove the upper case. See "Upper Case Removal". Disconnect two connectors from the Power Supply Board and two connectors from the Control Logic Board. Remove five Phillips screws fastening the Power Regulator Board. Remove the Power Regulator Board.

### POWER SUPPLY UNIT REMOVAL

Remove the upper case. See "Upper Case Removal". Disconnect two connectors to the Power Regulator Board. Remove four screws fastening the Power Supply Unit and two screws fastening the power cord clamp. Remove the Power Supply Unit from the Printer.

### PRINTER MECHANISM REMOVAL

Place the Printer upside down on a soft surface. Remove three Phillips screws from the Printer lower case. Set the Printer upright and remove the upper case. See "Upper Case Removal". Disconnect Connectors CN4, CN5, CN7 and CN8 from the Control Logic Board. Disconnect a ground wire from the Power Supply Unit to the Printer Mechanism. Remove five mounting screws that hold the Printer Mechanism. Lift the Printer Mechanism out of the lower case.

# PRELIMINARY SERVICE CHECKS (Continued)

## PREVENTATIVE MAINTENANCE

### ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of any of the Computer system; Computer, Monitor, Printer, or other power devices.

### ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptible power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

### KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

### DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If the disk drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

### PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

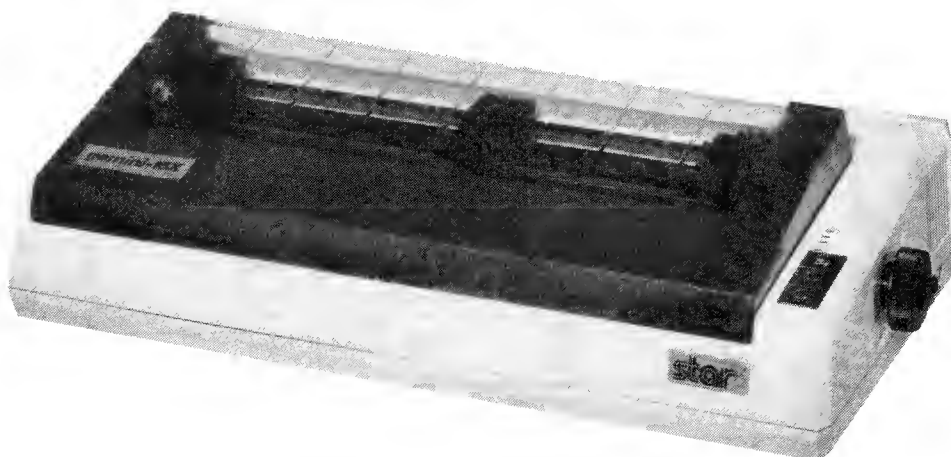
### STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

### MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long periods of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

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## PRELIMINARY SERVICE CHECKS

ENCLOSED

## SAFETY PRECAUTIONS

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Star Micronics Printers are warranted for one year from date of purchase. If any service or modifications are performed during this time by other than Authorized Star Micronics Service Centers, the manufacturers' warranty will be void.

# SAMS™

**Howard W. Sams & Co., Inc.**

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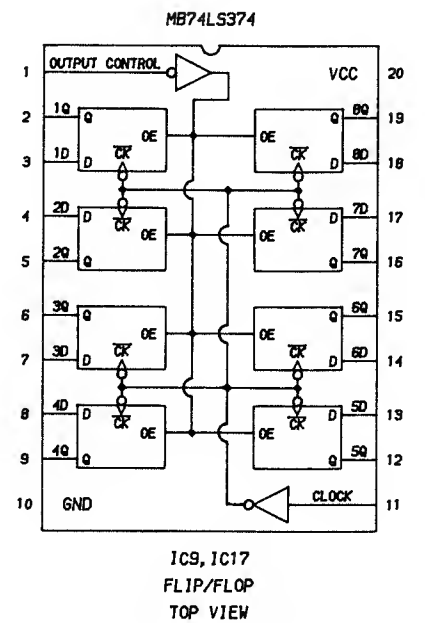
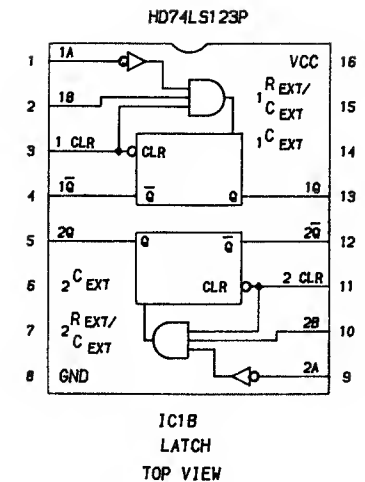
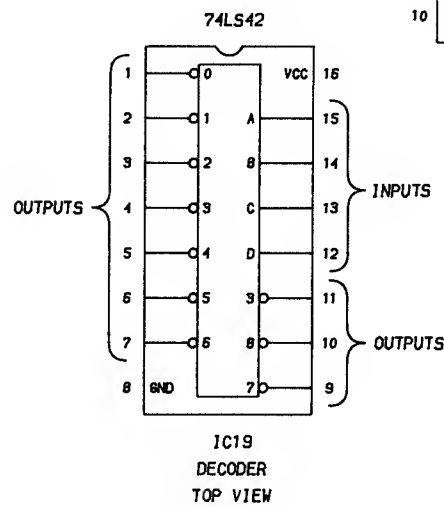
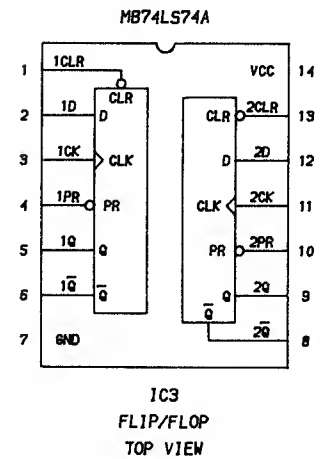
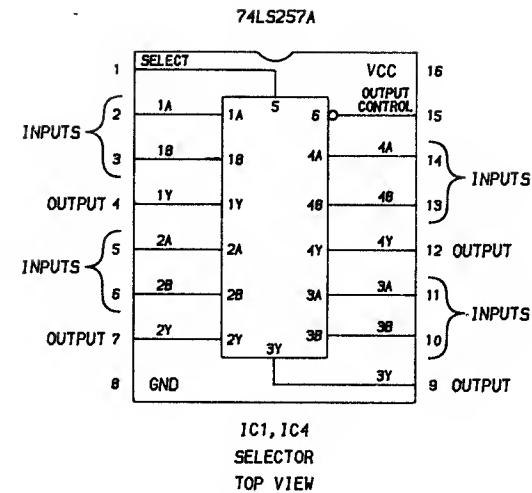
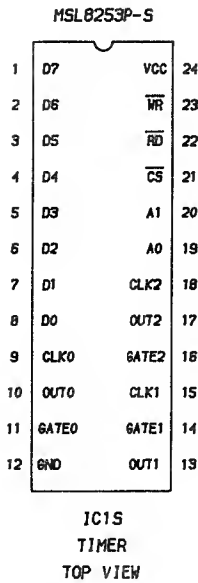
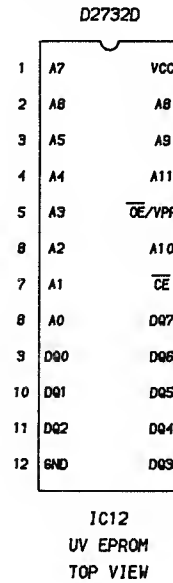
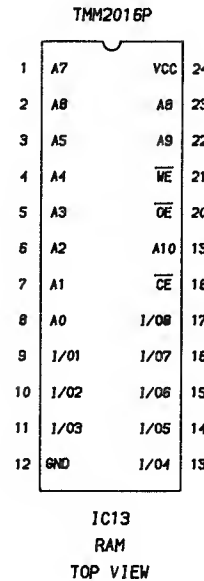
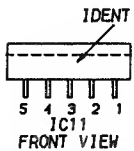
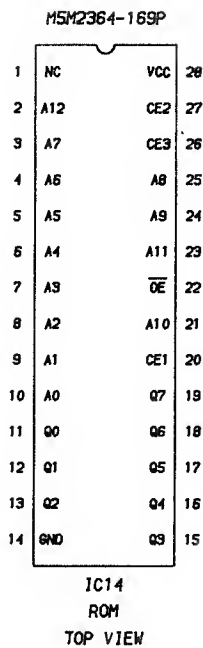
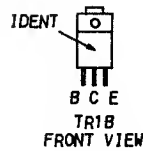
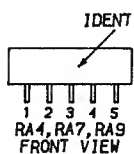
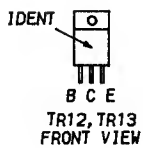
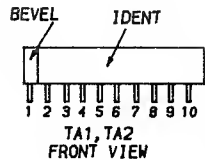
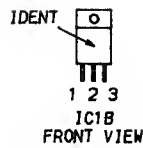
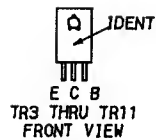
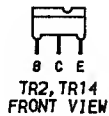
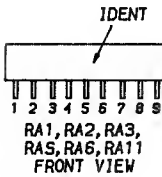
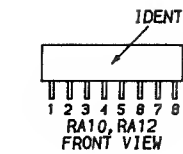
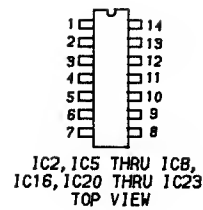
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IC PINOUTS & TERMINAL GUIDES



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## SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductors "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, mechanical or electrical parts, or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Printer cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Printer to water. If exposed to water turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer unattended or plugged into the AC outlet for long period of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

## LINE DEFINITIONS

<b>A0 THRU A15</b> .....	Address	<b>INPUT P</b> ....	Input Prime, Resets Control Circuit, Initializes Printer, Clears Memory Buffer
<b>B BUSY</b> .....	Buffer Busy	<b>P BUSY</b> .....	Printer Busy
<b>BUFFER</b> .....	Buffer	<b>P END</b> .....	Paper End
<b>C1, C2</b> .....	Carriage Motor Driving Pulses	<b>RD</b> .....	Read
<b>C3, C4</b> .....	Paper Feed Motor Driving Pulses	<b>RES</b> .....	Reset
<b>CK</b> .....	Clock	<b>RTS/SLCT</b> .....	Ready to Send/Select
<b>CS5, CS6, CS7</b> .....	Chip Select	<b>RXD</b> .....	Received Data
<b>CTS</b> .....	Clear to Send	<b>S BUSY/ACK</b> .....	Serial Busy/Acknowledge
<b>D0 THRU D7</b> .....	Data	<b>SEL IN</b> .....	Select Input
<b>DCD</b> .....	Detected Carrier Detection	<b>SERIAL</b> .....	Serial
<b>DSR/SEL IN</b> .....	Data Set Ready/Select Input	<b>STB OUT</b> .....	Strobe Out
<b>DTR/ERR</b> .....	Data Terminal Ready/Error	<b>STB OUT/P BUSY</b> .....	Strobe Out/Printer Busy
<b>E2, E5</b> .....	Print Head Driving Pulses	<b>TXD/ON LINE</b> .....	Transmitted Data/On Line
<b>E6</b> .....	Carriage Motor Driving Pulses	<b>WR</b> .....	Write
<b>E7, E8</b> .....	Paper Feed Motor Driving Pulses		
<b>ERR</b> .....	Error		

Any Bar above any alphabetical or numerical combination indicates line active in a Low (0) state.

## TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment Name	B & K Precision Equipment No.	Sencore Equipment No.	Simpson Equipment No.
OSCILLOSCOPE	1570A, 1590A, 1596	SC61	454
LOGIC PROBE	DP51		
LOGIC PULSER	DP101		
DIGITAL VOM	2830	DVM37, DVM56, SC61	463, 467, 470, 474, 467E
ANALOG VOM	277		260-7, 160, 165, 260-6XL, 260-7P, 260-6XLP
ISOLATION TRANSFORMER	TR110, 1604, 1653, 1655	PR57	
FREQUENCY COUNTER	1803, 1805	FC71, SC61	710
COLOR BAR GENERATOR	1211A, 1248, 1251, 1260	CG25, VA62	431
RGB GENERATOR	1260		
FUNCTION GENERATOR	3020		420A, 420D
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44	HP200	248 00168, 00411, 00749
TEMPERATURE PROBE	TP-28		IR-10, 00760, 00758; 383, 389, 388
CRT ANALYZER	467, 470	CR70	

## TROUBLESHOOTING

Refer to Alternate Hookup Chart for cable connections of Serial Interface Board and 4K/8K Buffer Board Options when used.

### ALTERNATE HOOKUP CHART

PARALLEL	CONNECT
Standard Setting	CN2 to CN3
With 4K/8K Buffer Board	CN2 to CN2C and CN1C to CN3
SERIAL	CONNECT
Standard Setting	CN2A to CN3
With Interface Board	
With 4K/8K Buffer Board	CN2A to CN2C and CN1C to CN3

### POWER SUPPLY

Apply 120VAC power to the Printer and turn On the Power Switch (S1). If the power indicator (LED1) is Off and the Printer is dead, check for 120VAC across the primary winding of Power Transformer (T1). If the 120VAC is missing, check the AC Fuse (F1), Power Switch and the line cord (P1).

If the 120VAC is present, check for 25.0VAC between pins 3 and 4 of Connector CN9 and check for 8.3VAC between pins 1 and 2 of Connector CN9. Check for 30.0VAC between pins 1 and 3 of Connector CN10. If any of the AC voltages are missing, check the Power Transformer.

If the AC voltages are present on the secondary windings of the Power Transformer, check for 10.0V at the cathode of Bridge Rectifier (BD2). If the 10.0V is missing, check BD2. Check for 5.0V at pin 2 of CN11. If the 5.0V is missing, check the 5.0V Regulator (IC1B). Check for 34.0V at the cathode of Bridge Rectifier (BD1).

If the 34.0V is missing, check BD1. Check for 32.7V at the cathode of Rectifier D9B and check for 25.0V at the emitter of Regulator Transistor (TR1B). Check for 31.0V at the cathode of Diode D8B. If any of these voltages are missing, also check associated components.

If the Fuse F1 is open, turn the Printer Off and disconnect all connectors from the Power Regulator Board and the Control Logic Board. Replace Fuse F1 and turn the Printer On. If the fuse opens again, check for a shorted capacitor on the AC Filter Board. Also check the Power Transformer for shorted turns. If Fuse F1 does not open, turn the Printer Off, reconnect CN9 and CN10 and power up the Printer.

If Fuse F1 opens, check Regulator IC1B, Transistor TR1B, Rectifiers BD1, BD2 and Diodes D1B thru D9B on the Power Regulator Board for a short. If the fuse does not open, reconnect Connector CN11 to CN15 on the Control Logic Board and turn power On. If Fuse F1 opens, replace the Control Logic Board. If Fuse F1 does not open, turn Printer Off and connect CN17 to CN16, and connect CN7. Power the Printer up.

If Fuse F1 opens, check the Print Head and the Print Head cable. If Fuse F1 does not open, turn Printer Off and connect CN6 and power up. If Fuse F1 opens replace the Carriage Motor (M1) and recheck the Printer again. If Fuse F1 does not open, turn Printer Off and connect CN5 and power up.

If fuse opens, check or replace the Paper Feed Motor (M2). If the fuse does not open, turn Printer Off and remove pins 5 thru 10 of CN4 and reconnect CN4. Power up Printer. If the Fuse opens, check and replace the Home Position Detector Board. Turn Printer Off if Fuse does not open, reconnect pins 5 thru 8 of CN4 and power up the Printer.

If the Fuse F1 opens, check the Paper Out Detector Board for a short. Turn Printer Off if Fuse does not open, reconnect pins 9 and 10 of CN4 and power up. If Fuse F1 opens replace the Right-End Detector Unit.

### PAPER FEED MOTOR ASSEMBLY DOES NOT MOVE

Check for 10.0V at the anode of Diode D21, check for 25.0V at the emitter of Transistor TR13. If the voltages are missing, refer to the "Power Supply" section of this Troubleshooting guide. If the voltages are present, turn Off the Printer, disconnect CN5 and check the resistances of the windings of the Paper Feed Motor (M2) for 50.6 ohms between pin 1 and pin 5, between pin 1 and pin 6, between pin 2 and pin 3 and between pin 2 and pin 4 of Connector CN5. If these resistances are abnormal, check the Paper Feed Motor by substitution. If the resistances of the motor are normal, check for a pulse at the base of Transistor TR13. If pulses are not present, check IC23 by substitution. Check for pulses at pins 4, 6, 8 and 12 of IC22. If these pulses are not present, check IC22 by substitution. If the pulses are present, check Transistor TR13 and Driver IC (TA2) by substitution.

### CARRIAGE ASSEMBLY DOES NOT MOVE

Check for 10.0V at the anode of Diode D22. Check for 25.0V at the emitter of Switch Transistor (TR12). If the 25.0V is missing, refer to the "Power Supply" section of this Troubleshooting guide. If the 25.0V is present at the emitter of Transistor TR12, check for 24.5V at the collector of TR12 when the Printer is in self-test mode. If the 24.5V is missing at the collector of Transistor TR12, check for pulses at the base of TR12 when the Printer is in self-test mode. If there are no pulses at the base of Transistor TR12, check pulses at pins 3 and 4 of IC24 and pin 15 of IC1. If the pulses are present, check Transistor TR12. If the 24.5V is present at the collector of Transistor TR12, check the resistance of the windings of the Carriage Motor (M1). Check for pulses at pins 3, 5, 7, 9 of Driver IC (TA1). If the pulses are missing, check TA1 and IC24 by substitution.

### PRINTER WILL NOT PRINT IN ON-LINE MODE (WILL NOT RECEIVE DATA)

Confirm that the On-Line Switch changes the status of the Printer. The On-Line and Ready LEDs should turn On and Off when the On-Line Switch is pressed. If the On-Line Switch does not operate, check the Switch and Connector CN8. If the On-Line Switch works normally, check the interface cable between the Printer and the host Computer and the Connector CN1 and the cable connecting CN2 and CN3. If the cables and connectors are good, check for the right configuration between the host Computer and the Printer. Also check the settings of DIP Switches DSW1 and DSW2.

### SELF-TEST

Press the Power Switch (S1) and the L.F. Switch (SW3A) at the same time. The Printer should go into a self-test mode that will print four lines showing the standard character set of the Printer. If the L.F. button is held down, the self-test



## TROUBLESHOOTING (Continued)

printout will continue. If the self-test does not function properly, check Connector CN8 for a good connection. Also check the L.F. Switch on the Control Panel Board. Make sure that the Paper Out Indicator (LED4) is Off and the Paper Out Switches (SW1, SW2) are operating. If the L.F. Switch is normal and the Paper Out circuit is functioning properly, check the Microprocessor (IC10) and the ROMs (IC12 thru IC15).

### PRINT HEAD

The Print Head (M3) is moving back and forth but is not printing or some dots are missing. Check for approximately 31V at pin 6 of Connector CN7. If the 31V is missing, refer to the "Power Supply" section of this Troubleshooting guide. If the 31V is present at pin 6 of CN7, check for pulses at the collectors of Driver Transistors (TR3 thru TR11). If pulses are present at the collectors of Transistors TR3 thru TR11, check the Print Head by substitution. Also check the Head Cable Board and Connector CN7. If the pulses are missing at any of the collectors of Transistors TR3 thru TR11, check for pulses at the base of the Transistor with the missing collector pulses. If pulses are present at the base,

check the Transistor. Also check the Diode and the Zener Diode in the collector circuit of the affected Transistor. If the pulses are missing at the base of the Transistor, check Flip/Flop (IC17) and Resistor Network (RA10 or RA12).

If the pulses are missing on all of the collectors of Driver Transistors TR3 thru TR11, check for pulses at pin 1 of IC17. If the pulses are present at pin 1 of IC17, check IC17. If the pulses are missing at pin 1 of IC 17, check for pulses at pin 2 of IC22. If the pulses are present at pin 2 of IC22, check IC10, IC18 and IC21. If the pulses are missing at pin 2 of IC22, check IC22, IC21 and IC20.

### MICROPROCESSOR OPERATION

Check for 5.0V at pin 64 of the Microprocessor (IC10). If the 5.0V is missing, refer to the "Power Supply" section of this Troubleshooting guide.

Check for 4MHz clock signal at pin 30 of the IC10. If the 4MHz clock signal is missing at pin 30 of IC10, check the Crystal (X-TAL) and Capacitors C11 and C12.

## CONNECTOR CONFIGURATION FOR PARALLEL INTERFACE

Pin No.	Signal	Direction	Activity
1	<u>STROBE</u>	IN	Strobe Pulse used to read data in. It is normally High. When the pulse goes Low, data is read in.
2	DATA 1	IN	Parallel data bits 1 through 8 information.
thru	thru		
9	DATA 8		
10	<u>ACK</u>	OUT	A pulse of 9 $\mu$ sec to acknowledge that data is received and the Printer is ready for new data.
11	BUSY	OUT	A signal that indicates the Printer is busy. When the signal goes Low, next data transmission is permitted.
12	PAPER END	OUT	This signal is normally Low. If the signal is High it indicates a paper out condition. If DSW2-1 is set to Off position, this signal is held Low.
13	SELECTED	OUT	When this signal is High the Printer is in "On-Line" mode.
14	NC		Not Used
15	NC		Not Used
16	SIGNAL GND		Signal Ground
17	CHASSIS GND		Printer Frame Ground
18	+5VDC	OUT	External Power +5VDC, 50mA Maximum
19	Return Pin 1		
20	Return Pin 2		
thru			
27	Return Pin 9		
28	Return Pin 10		
29	Return Pin 11		
30	Return Pin 12		
31	<u>INPUT PRIME</u>	IN	This signal is Low when the Printer is initialized or reset and the memory buffer is cleared.
32	ERROR	OUT	This signal goes low when the Printer detects abnormal status.
33	EXT GND		External Ground
34	NC		Not Used
35	NC		Not Used
36	NC		Not Used

## MISCELLANEOUS ADJUSTMENTS

### PRINT HEAD TO PLATEN GAP ADJUSTMENT

Place the Platen Adjust Lever at the second step position (handle straight up). Insert a feeler gauge between the ribbon guide and the platen. The gap should measure between 0.25mm and 0.35mm. Check the gap with the Print Head at the left, center and right of platen for uniformity.

If the platen gap is out of tolerance, the following adjustment is required.

Move the Platen Adjust Lever all the way forward until adjust bush hole lines up with frame hole. Fasten the left and right adjust bushes with an (M3 × 6) screw into left and right frame tap holes. Remove nut and lock washer holding adjust lever. If the gap is too wide place the adjust lever on point A or B. See Figure 1. If gap is too narrow place the adjust lever on point C or D. See Figure 1. Retighten nut on adjust lever and remove the two retaining screws from tap holes. Check gap measurement.

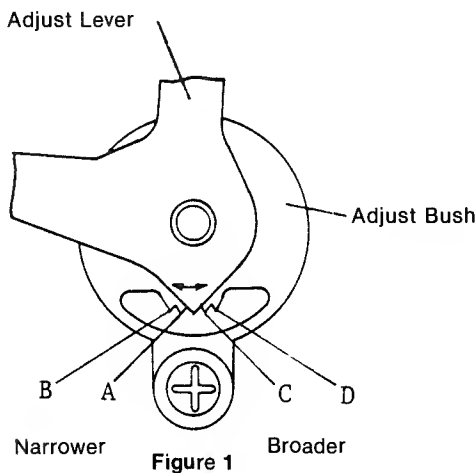


Figure 1

### CARRIAGE POSITION ADJUSTMENT (HOME POSITION)

Turn the Printer On. The Carriage will move to the left and stop. Measure the gap between the adjust bush and the Carriage. It should be between 1 and 2mm. See Figure 2. To adjust, loosen the screw on the Home Position Detector Board. Pivot the board either left or right depending if the gap is too wide or too narrow. To check the adjustment turn the Printer On and measure the gap. Repeat the procedure until gap setting is correct.

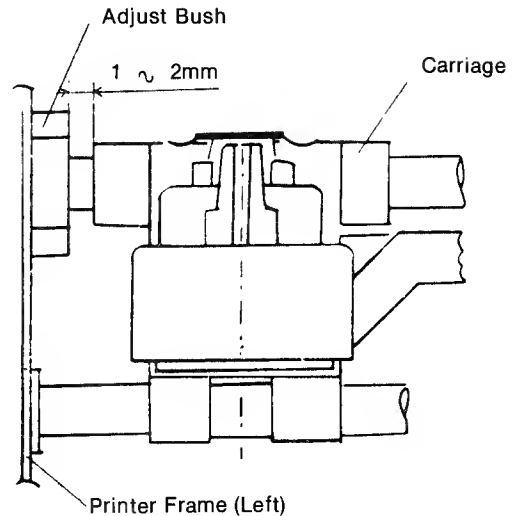


Figure 2

### RIGHT-END DETECTOR ADJUSTMENT

If the Right-End Detector Switch is not closing when the Carriage Assembly is moved to the far right, adjustment is required. Remove the ink ribbon spools. Remove two pins holding Ribbon Base Assembly and remove assembly. Slide Carriage Assembly to far right. Loosen screw in slotted hole of detector switch. Pivot switch until it just closes and tighten screw.

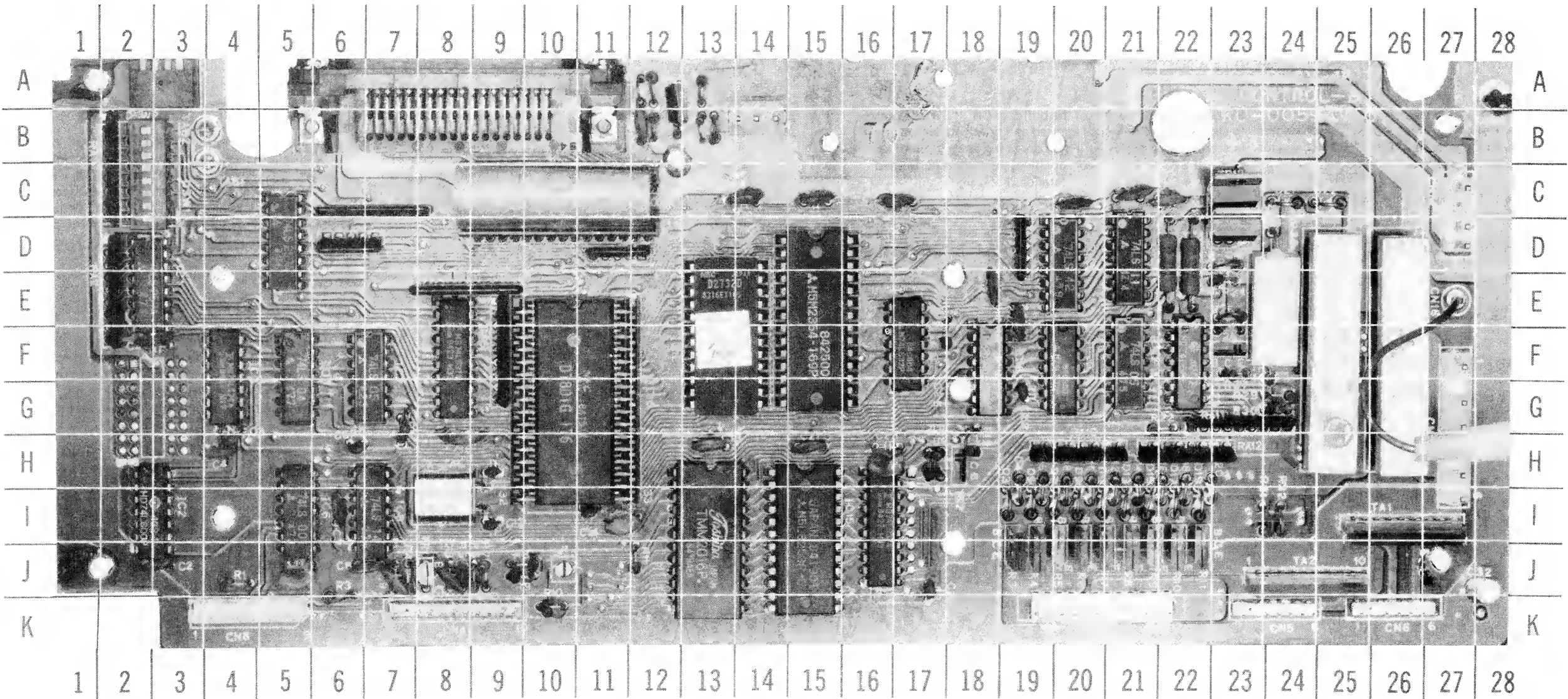
### TIMING BELT TENSION ADJUSTMENT

Slide Carriage Assembly to far right. Locate left timing belt pulley Adjusting Plate. Loosen screw in slotted hole of Adjusting Plate. Adjust belt tension for 30 grams ± 10%. Adjustment is made by pushing the pulley to the left until proper tension is obtained. If adjustment cannot be made within tolerance, replacement of timing belt is required. See Timing Belt Removal. Tighten screw and apply screw lock.

CONTROL LOGIC BOARD GridTrace LOCATION GUIDE

C1	F-3	C17	B-12	C33*	D-22	D4	H-19	D20	H-22	IC12	F-13	R5	J-8	R21	D-22	RA3	G-7	TR3	J-19
C2	J-3	C18	C-14	CN1	A-8	D5	I-19	D21	I-24	IC13	I-13	R6	J-9	R22	G-21	RA4	D-6	TR4	J-19
C3	H-4	C19	H-13	CN2	C-10	D6	H-19	D22	C-25	IC14	E-15	R7	J-9	R23	D-23	RA5	E-8	TR5	J-20
C4	H-4	C20	C-15	CN3	D-10	D7	I-20	DSW1	C-2	IC15	I-15	R8	J-10	R24	E-23	RA6	F-9	TR6	J-20
C5	J-5	C21	H-15	CN4	K-8	D8	H-20	DSW2	A-3	IC16	F-17	R9	J-9	R25	E-23	RA7	D-11	TR7	J-21
C6	H-6	C22	C-17	CN5	K-24	D9	H-20	IC1	E-2	IC17	I-16	R10	K-10	R26	F-23	RA9	D-19	TR8	J-21
C7	I-6	C23	H-16	CN6	K-26	D10	H-20	IC2	I-2	IC18	F-18	R11	J-12	R27	F-23	RA10	H-20	TR9	J-21
C8	J-7	C24	J-17	CN7	K-20	D11	I-20	IC3	F-4	IC19	E-20	R12	A-12	R28	E-24	RA11	G-23	TR10	J-22
C9	J-7	C25	G-18	CN8	K-4	D12	H-21	IC4	D-5	IC20	F-20	R13	B-12	R29	G-24	RA12	H-22	TR11	J-22
C10	H-8	C26	E-18	CN13	B-14	D13	I-21	IC5	F-5	IC21	D-21	R14	A-13	R30	G-24	TA1	I-26	TR12	C-23
C11	H-9	C27	E-19	CN14	C-27	D14	H-21	IC6	I-5	IC22	F-21	R15	B-15	R31	I-24	TA2	J-24	TR13	D-23
C12	I-9	C28	G-19	CN15	G-27	D15	I-21	IC7	F-7	IC23	F-22	R16	F-18	R32	I-24	TAB1	B-4	TR14	F-23
C13	J-8	C29	C-20	CN16	E-27	D16	H-22	IC8	I-7	R1	J-4	R17	H-17	R33	F-25	TAB2	B-4		
C14	I-11	C30	C-21	D1	A-12	D17	I-22	IC9	F-8	R2	G-7	R18	H-17	R34	F-26	TAB3	A-28		
C15	I-11	C31	C-22	D2	B-13	D18	H-22	IC10	G-11	R3	K-6	R19	H-18	RA1	C-2	TR1	J-8		
C16	B-12	C32	J-28	D3	I-19	D19	I-22	IC11	A-12	R4	J-7	R20	D-22	RA2	E-2	TR2	H-18		

\* Located on other side of board.



STAR  
GEMINI-15X

**STAR**  
**CP-16**  
**GEMINI-15X**

## STAFF

**GEMINI-15X**

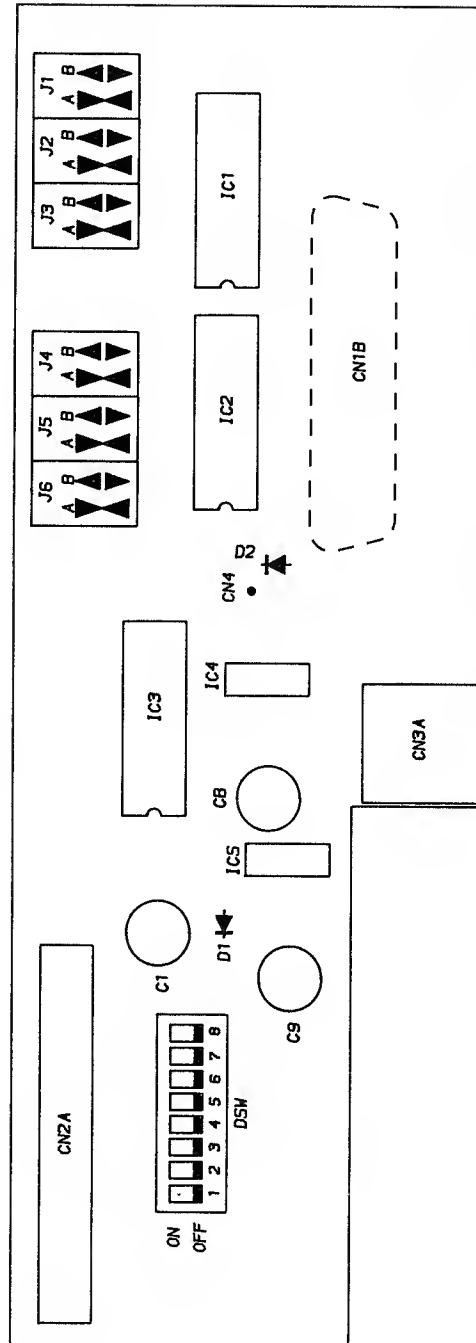
LOGIC BOARD

BOARD

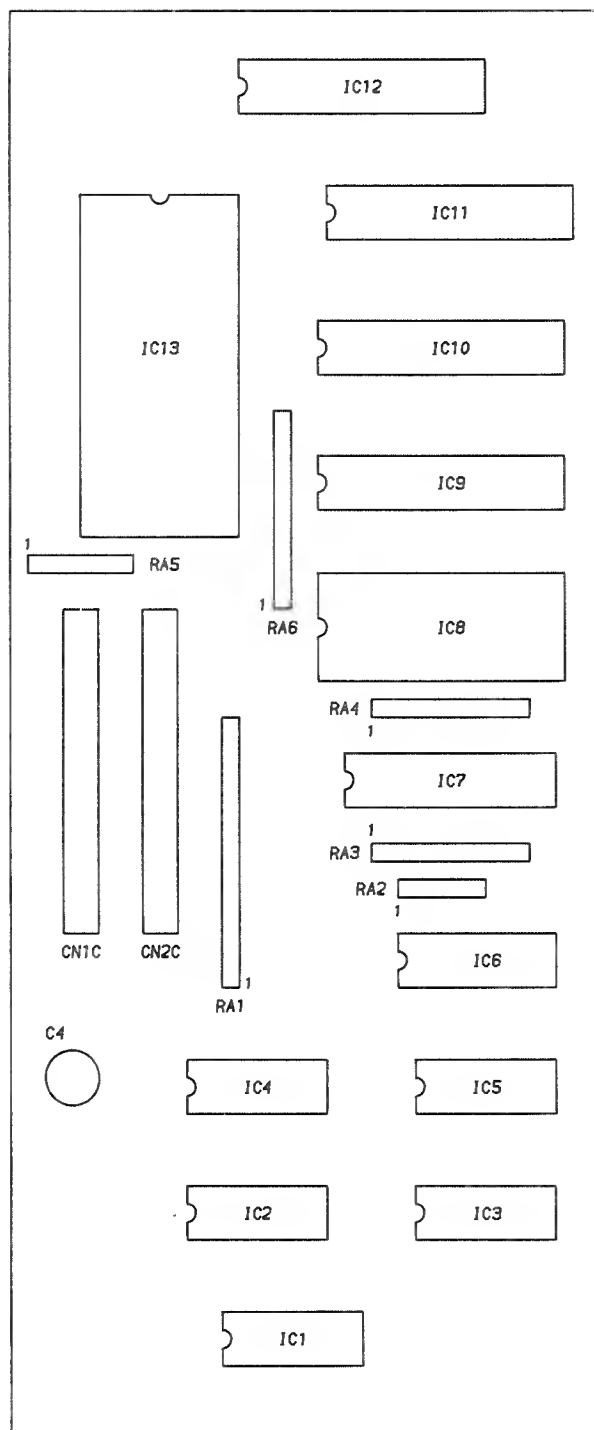


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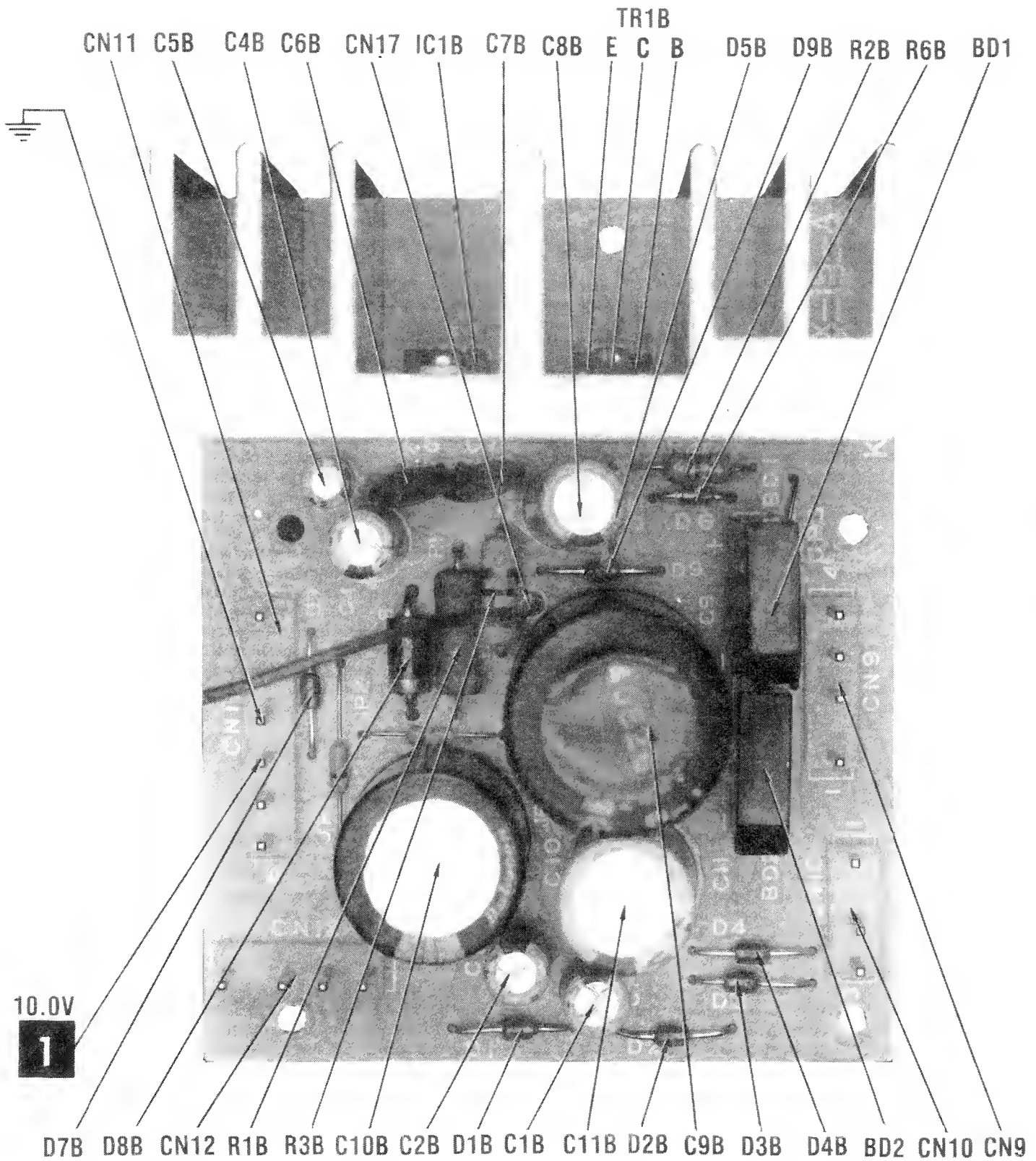












NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED.



## MECHANICAL REMOVAL AND REPLACEMENT

### PRINT HEAD REMOVAL

Remove the Printer cover. Remove the ink ribbon. While holding the Head Cable Board, extract the head cable from the head connector using the plastic pull tab under the head cable at the connector. Remove two screws and washers fastening the Print Head (M3) to the Carriage Assembly (21). Pull the Print Head upwards and remove it.

### PLATEN ASSEMBLY REMOVAL

Remove the upper case and Tractor Unit. See "Disassembly Instructions" and "Tractor Unit Removal". Remove two screws at both ends of the Platen Cover (24) and remove the cover. Remove the stop ring (55) that holds the idler gear (45) and draw the idler gear out as much as possible. Remove the stop ring (56) on the opposite side of the Platen Assembly and draw out the wave washer (43), poly-slider (44) and bushing (42). Draw out Platen until bushing on gear side comes off. Lift Platen Assembly out of the Printer Mechanism.

### TRACTOR UNIT REMOVAL

Pull Left and Right Snap Levers toward the front at the same time. While holding the levers forward, rotate the Tractor Unit up and back to clear the Paper Clamp Lever pivot posts. Lift Tractor Unit clear of the supporting stopper posts.

### CARRIAGE MOTOR REMOVAL

Remove the Printer Mechanism. See "Printer Mechanism Removal". Remove the tie wrap holding lead wires coming from the Carriage Motor (M1). Loosen one screw fastening the Adjusting Plate (26). Push the Timing Pulley to the right in reference to platen (22). Remove three Phillips screws securing the Motor Holder (4) to the mechanism. Remove

the Motor Holder from the frame base and remove the Timing Belt. Remove two Phillips screws holding the Carriage Motor to the Motor Holder. Reverse the procedure to install replacement motor. See Miscellaneous Adjustments for Timing Belt Tension Adjustment.

### PAPER FEED MOTOR REMOVAL

Remove the Printer Mechanism. See "Disassembly Instructions". Remove tie wrap holding lead wires. Remove three Phillips screws fastening Paper Feed Motor (M2). Reverse the procedure to install replacement motor.

### RIBBON BASE ASSEMBLY REMOVAL

Remove upper case. See "Disassembly Instructions". Remove roll pins at each end of Ribbon Base Assembly (27). Lift assembly up in front and slide it out of the notches in frame pieces. This will expose Timing Pulley, Adjusting Plate Assembly (26), ribbon movement (spool) gears with clutch lever assembly and Right End Detector Switch (SW3).

### TIMING BELT REMOVAL

Remove Printer Mechanism, Print Head (M3), Ribbon Base Assembly (27) and Carriage Motor (M1). Refer respectively to "Disassembly Instructions", "Print Head Removal", "Ribbon Base Assembly Removal" and "Carriage Motor Removal". Loosen set screw of Adjusting Plate (26) and free the belt from the Timing Pulley. Remove two screws holding Head Cable Board (16). Stand Printer Mechanism on its back and carefully pull Head Cable Board out thru the large square cutout. Move Print Head over the cutout. Remove the screw securing the belt clamp to the Carriage Assembly (21), and free Timing Belt. To install new belt reverse this procedure. See Timing Belt Tension Adjustment in Miscellaneous Adjustments.

## DISASSEMBLY INSTRUCTIONS

### UPPER CASE REMOVAL

Remove the brown plastic Printer cover. Remove the platen knob. Remove three Phillips screws that fasten the upper case to the lower case. Pry forward three tabs at the front edge of the upper case, then carefully lift the upper case. Disconnect the Control Panel Board connector and the ground wire. Remove the upper case from the Printer.

### CONTROL PANEL BOARD REMOVAL

Remove the upper case. See "Upper Case Removal". Then remove two Phillips screws fastening the Control Panel Board to the upper case. Remove Control Panel Board.

### CONTROL LOGIC BOARD REMOVAL

Remove the upper case. See "Upper Case Removal". Disconnect the ground connectors, the Power Supply Board connectors and the connectors to the Printer Mechanism and the Control Panel Board. Remove 5 screws fastening the Control Logic Board. Remove the Control Logic Board from the Printer.

### POWER REGULATOR BOARD REMOVAL

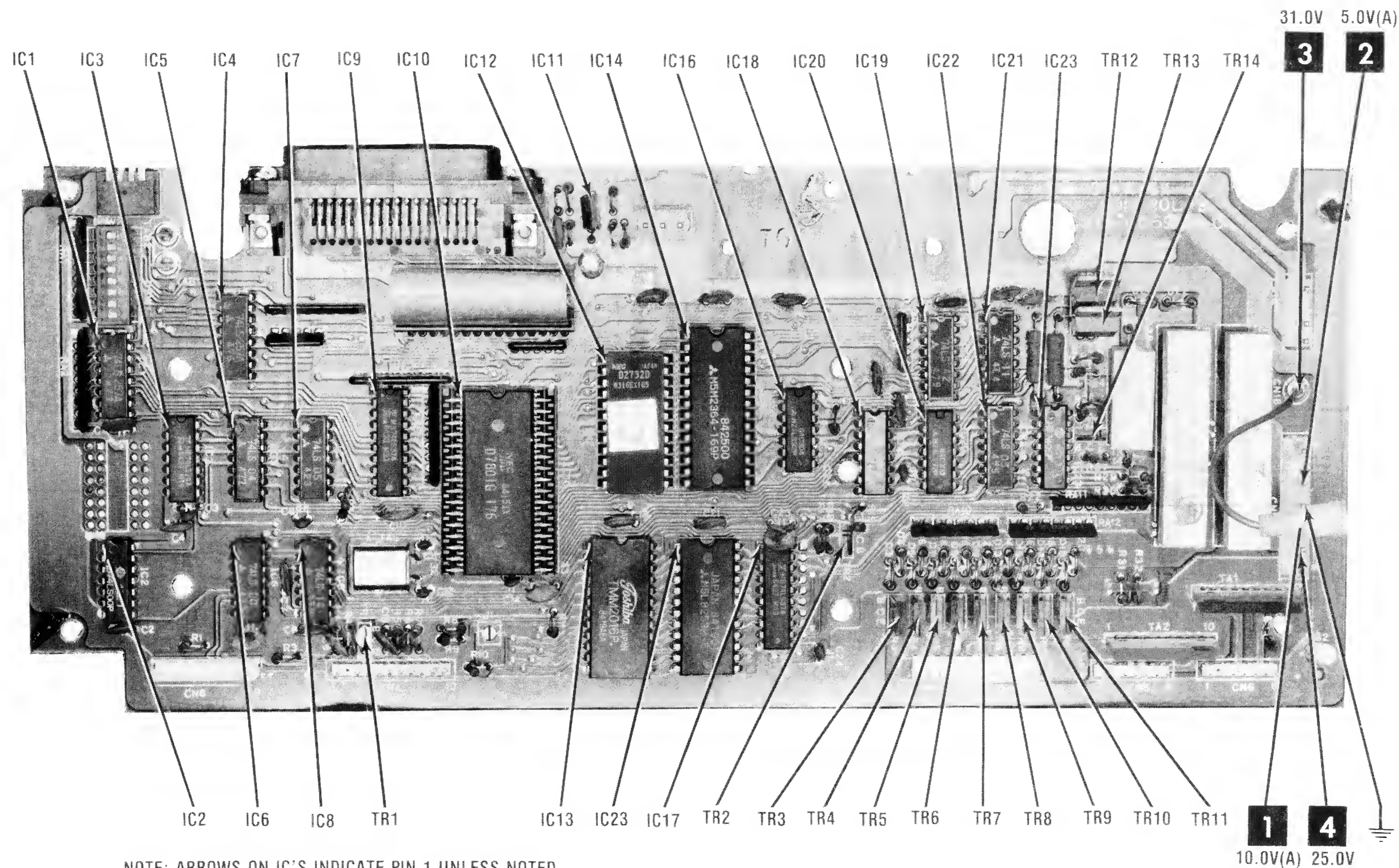
Remove the upper case. See "Upper Case Removal". Disconnect two connectors from the Power Supply Board and two connectors from the Control Logic Board. Remove five Phillips screws fastening the Power Regulator Board. Remove the Power Regulator Board.

### POWER SUPPLY UNIT REMOVAL

Remove the upper case. See "Upper Case Removal". Disconnect two connectors to the Power Regulator Board. Remove four screws fastening the Power Supply Unit and two screws fastening the power cord clamp. Remove the Power Supply Unit from the Printer.

### PRINTER MECHANISM REMOVAL

Place the Printer upside down on a soft surface. Remove three Phillips screws from the Printer lower case. Set the Printer upright and remove the upper case. See "Upper Case Removal". Disconnect Connectors CN4, CN5, CN7 and CN8 from the Control Logic Board. Disconnect a ground wire from the Power Supply Unit to the Printer Mechanism. Remove five mounting screws that hold the Printer Mechanism. Lift the Printer Mechanism out of the lower case.



## PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA					
			NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
B01	KBL02	08990202	(7)	NTE167	ECG167	SK3647/167	WEP1052/167	212-Z9001
B02	KBL02	08990202	(7)	NTE167	ECG167	SK3647/167	WEP1052/167	212-Z9001
D1A	RD4.7EB1	08020030	(5)	NTE5009A	ECG5009A	SK4A7/5009A	WEP1409/5009	103-279-09
D1B	1S1588	08000001	(6)	NTE519	ECG519	SK3100/519	WEP925/519	103-131
D2	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D2B	1S1588	08000001	(5)	NTE519	ECG519	SK3100/519	WEP925/519	103-131
D3	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D3B	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D4	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D4B	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D5	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D5B	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D6	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D6B	CZ255	08020022	(7)	NTE5082A	ECG5082A	SK25V/5082A	WEP1165/5082	103-251
D7	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D7B	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D8	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D8B	GP30B	08000017	(7)	NTE5801	ECG5801	SK9004/5801	WEP4001/5801	903-334
D9	GP-30B	08020025	(5)	NTE5801	ECG5801	SK9004/5801	WEP4001/5801	903-334
D9B	W03B	08020025	(7)	NTE116	ECG116	SK3311	WEP156	212-76-02
D10	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D11	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D12	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D13	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D14	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D15	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D16	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D17	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D18	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023

# PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

## SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA					
			NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D19	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D20	BZ197	08020020	(5)	NTE5079A	ECG5079A	SK20V/5079A	WEP1163/5079	103-Z9023
D21	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
D22	W03B	08020025	(5)	NTE116	ECG116	SK3311	WEP156	212-76-02
IC1	74LS257A	08210040	(5)	NTE74LS257	ECG74LS257	SK74LS257		HE-443-802
	74LS257		NTE74LS257	ECG74LS257	SK74LS257		HE-443-802	
IC1B	AN7805	08200043	(7)	NTE960	ECG960	SK3591/960		221-Z9043
	uPC7805H		NTE960	ECG960	SK3591/960		221-Z9043	
IC2 (IC8)	HD74LS00P	08210001	(5)	NTE74LS00	ECG74LS00	SK74LS00		HE-443-728
	74LS00		NTE74LS00	ECG74LS00	SK74LS00		HE-443-728	
IC3	MB74LS74A	08210033	(5)	NTE74LS74A	ECG74LS74A	SK74LS74A		HE-443-730
	74LS74		NTE74LS74A	ECG74LS74A	SK74LS74A		HE-443-730	
IC4	74LS257A	08210040	(5)	NTE74LS257	ECG74LS257	SK74LS257		HE-443-802
	74LS257		NTE74LS257	ECG74LS257	SK74LS257		HE-443-802	
IC5	74LS04	08210002	(5)	NTE74LS04	ECG74LS04	SK74LS04		HE-443-755
IC6	74LS00	08210001	(5)	NTE74LS00	ECG74LS00	SK74LS00		HE-443-728
IC7	74LS05	08210017	(5)	NTE74LS05	ECG74LS05	SK74LS05		HE-443-818
IC8 (IC10)	74LS14	08210023	(5)	NTE74LS14	ECG74LS14	SK74LS14		HE-443-872
	MB74LS374		NTE74LS374	ECG74LS374		HE-443-863		
IC9	74LS374	08210052	(5)	NTE74LS374	ECG74LS374			HE-443-863
IC10 (IC11)	D7801G-176	08220048						
	uPD7801G-176							
IC11 (IC12)	M51204	08200040	(5)	NTE1434	ECG1434	SK7634/1434		
	M51204L		ECG1434	SK7634/1434				
IC12 (IC13)	D2732D	08220014	(5)	NTE2732(12)	ECG2732(12)			
IC13 (IC14)	uPD2732		NTE2732(12)	ECG2732(12)				
	TMM2016P	NTE2128	ECG2128					
IC14 (IC15)	M5M2364-169P	08220028	(5)					
	M5L8253P-5							
IC15 (IC16)	8253C-5	08210053	(5)					
IC16 (IC17)	M74LS32P		NTE74LS32	ECG74LS32	SK74LS32		HE-443-875	
	74LS32	NTE74LS32	ECG74LS32	SK74LS32		HE-443-875		

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA					
			NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
IC17 (IC18)	MB74LS374 74LS374	08210052	(5)	NTE74LS374	ECG74LS374	SK74LS123 SK74LS123 SK74LS42		HE-443-863
IC18 (IC19)	HD74LS123P 74LS123		(5)	NTE74LS123	ECG74LS123			HE-443-863
IC19 (IC20)	74LS42		(5)	NTE74LS123	ECG74LS123			HE-443-942
			08210004	NTE74LS42	ECG74LS42			HE-443-807
IC20 (IC21)	M74LS32P 74LS32P	08210053	(5)	NTE74LS32	ECG74LS32	SK74LS32 SK74LS32 SK74LS11 SK74LS05 SK7406 SK7406		HE-443-875
IC21 (IC22)	74LS11		(5)	NTE74LS32	ECG74LS32			HE-443-875
IC22 (IC23)	74LS05		(5)	NTE74LS11	ECG74LS11			HE-443-864
IC23 (IC24)	HD7406P 7406		(5)	NTE74LS05	ECG74LS05			HE-443-818
		08210006	NTE7406	ECG7406	HE-443-698			
TA1,2 TR1	PU4124 C1740E	07650003	(5)	NTE85	ECG85	SK3122 SK3124A/289A SK3122 SK3124A/289A	WEP736/123A* WEP910/289 WEP736/123A WEP910/289	121-Z9065
	2SC2785	(5)	NTE85	ECG85	921-1114			
	TR1A	C1740S	(6)	NTE85	ECG85			121-Z9065
		2SC2785	07227851	NTE85	ECG85			921-1114
TR1B	D1277B 2SD1277B	07312771	(7)	NTE261	ECG261	SK3896/261 SK3896/261 SK3912 SK3114A/290A SK9370 SK9370	WEP261/261 WEP261/261 WEP911/290A+ WEP911/290A	121-Z9085
TR2	A937R		(5)	NTE261	ECG261			121-Z9085
	2SA1175		(5)	NTE17	ECG17			121-Z9003*
TR3 thru TR11	D986L 2SD986		07011751	(5)	NTE290A			ECG290A
TR12,13	B707K	07309861	(5)	NTE197	ECG197	SK3083/197 SK3083/197 SK3912 SK3114A/290A	WEP757/197 WEP757/197 WEP911/290A+ WEP911/290A	921-1309
	2SB707		(5)	NTE197	ECG197			121-988-03
	A937R		(5)	NTE17	ECG17			121-988-03
	2SA1175		(5)	NTE290A	ECG290A			121-Z9003*

\* Lead configuration may vary from original.

+ Rotate 180° to conform with original lead configuration.

(5) Control Logic Board.

(6) Control Panel Board.

(7) Power Regulator Board.

(12) Programming Required.

Item numbers in ( ) denotes alternate

board configuration.

## WIRING DATA

Shielded Hook-up Wire ..... Use BELDEN No. 8401 or 8421 (Single-Conductor)

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8208 (Two-Conductor)

..... Use BELDEN No. 8529 (Solid) Available in 13 Colors

..... Use BELDEN No. 8522 (Stranded) Available in 13 Colors

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### CAPACITORS

Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFGR. PART No.
C1A C2A	.0047 125VAC .0047 125VAC	

ITEM No.	RATING	MFGR. PART No.
C3A	.01 125VAC	

### RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
R28 (R32)	39 5% 5W Wire Wound	06293901	5W039	
R33 (R37)	33 5% 10W Wire Wound	06993301	10W033	
R34 (R38)	33 5% 10W Wire Wound	06993301	10W033	
RA1 thru RA3	Resistor Network (1)	06584723		
RA4	Resistor Network (2)	06584721		
RA5	Resistor Network (1)	06584723		
RA6	Resistor Network (3)	06581032		
RA7	Resistor Network (2)	06584721		
RA9	Resistor Network (4)	06581031		
RA10	Resistor Network (5)			
RA11	Resistor Network (6)	06582223		
RA12	Resistor Network (5)			

- (1) Contains Eight 4700.
- (2) Contains Four 4700.
- (3) Contains Eight 10K.
- (4) Contains Four 10K.
- (5) Contains Seven 1500.
- (6) Contains Eight 2200.

Item numbers in ( ) denotes alternate board configuration.

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### COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
T1	Power Transformer (1)		40851A (2)	

- (1) Part of Power Supply Unit Number 87223012 (For 120V), 87223050 (For 220V), 87223040 (For 240V, England), 87223040 (For 240V Australia).
- (2) Number on unit.

### FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
F1	5MT 1.25A @ 125V Time Lag	09990020		

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
BZ	Buzzer	45060201	QMB-111-P
DSW1	Switch	09090018	DIP, KSD08
DSW2	Switch	09090008	DIP, DYS-4
LED1	LED	08300027	Power, Green, SG240D
LED2	LED	08300027	Ready, Green, SG240D
LED3	LED	08300027	On-Line, Green, SG240D
LED4	LED	08300028	Paper Out, Red, GL9PR2
M1	Motor	87041011	Carriage
M2	Motor	87041020	Paper Feed
M3	Print Head	89070010	
M4	Sensor		Home Position Phototransistor ON1112
P1	Cord		AC, Power
S1	Switch		Power
SW1	Switch	87050360	Paper Out-Bottom, Magnetic Reed, Assembly
SW1A	Switch	09010024	On-Line, Push, J-P5029
SW2	Switch	87055041	Paper Out-Back, Magnetic Reed, Assembly
SW2A	Switch	09010024	Form Feed, Push, J-P5029
SW3	Switch	87059040	Right-End Detector, Assembly
SW3A	Switch	09010024	Line Feed, Push, J-P5029
X-TAL	Crystal	09250010	4MHz, (NR18-4MHz)
	Cabinet Foot		RUSSELL Replacement PAD-5017 (5 Required)
	Grommet (Rubber Foot)	80200160	RUSSELL Replacement GOB-415 (5 Required)
	P.C. Board	87232032	Control Logic
	P.C. Board	87232042	Power Regulator
	P.C. Board		AC Filter (Part of Power Supply Unit)
	P.C. Board	87220320	Control Panel
	P.C. Board	87055010	Head Cable

### CABINET & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Upper Case Assembly	87230410	Paper Separator	80530160
Printer Cover	87230030	Paper Guide	80530180
Platen Knob	87224010	Roll Paper Holder	80530140
Lower Case Assembly	87231011	Holder Shaft	83360010
Cord Clamp	83910361		



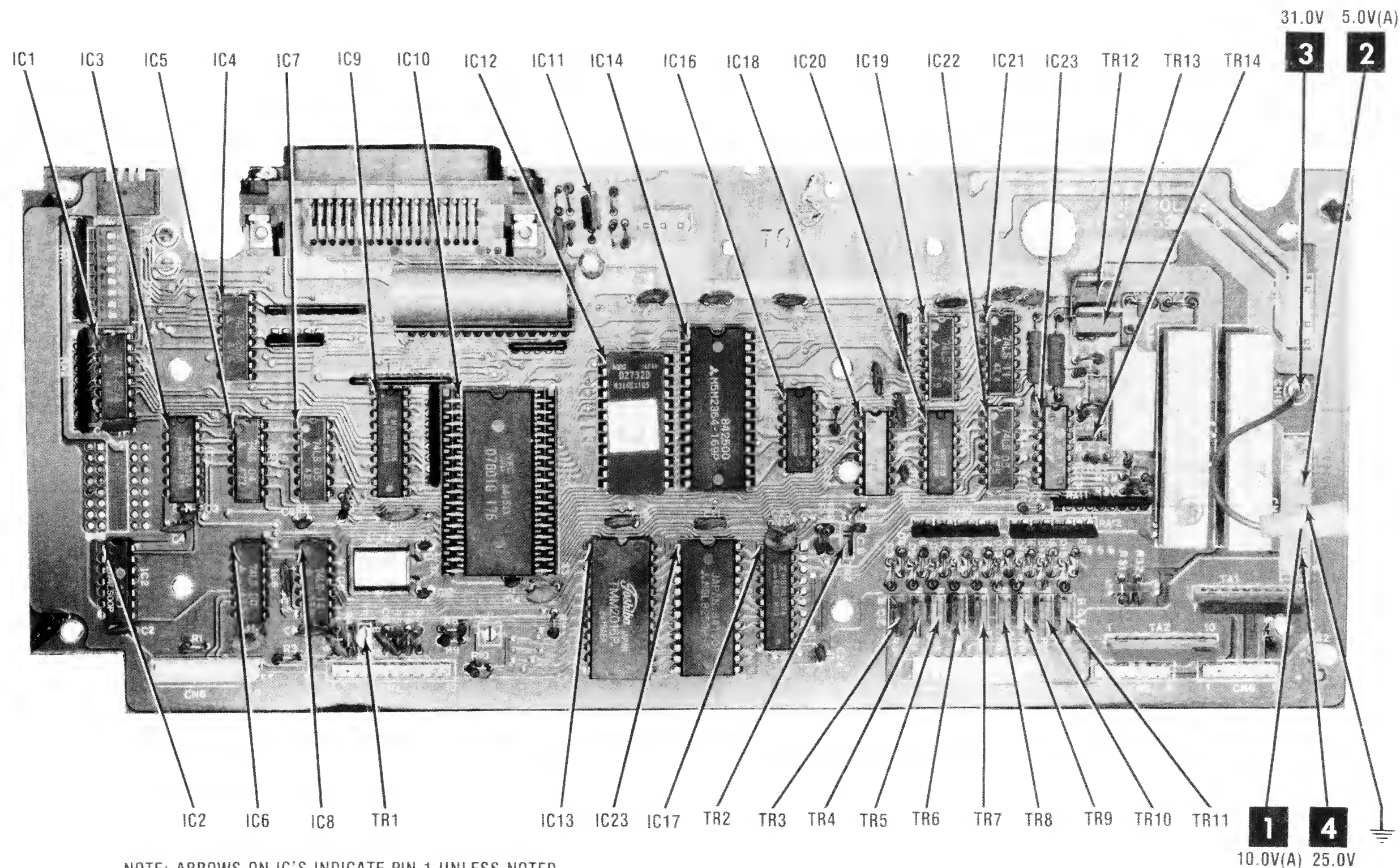
## MECHANICAL PARTS LIST

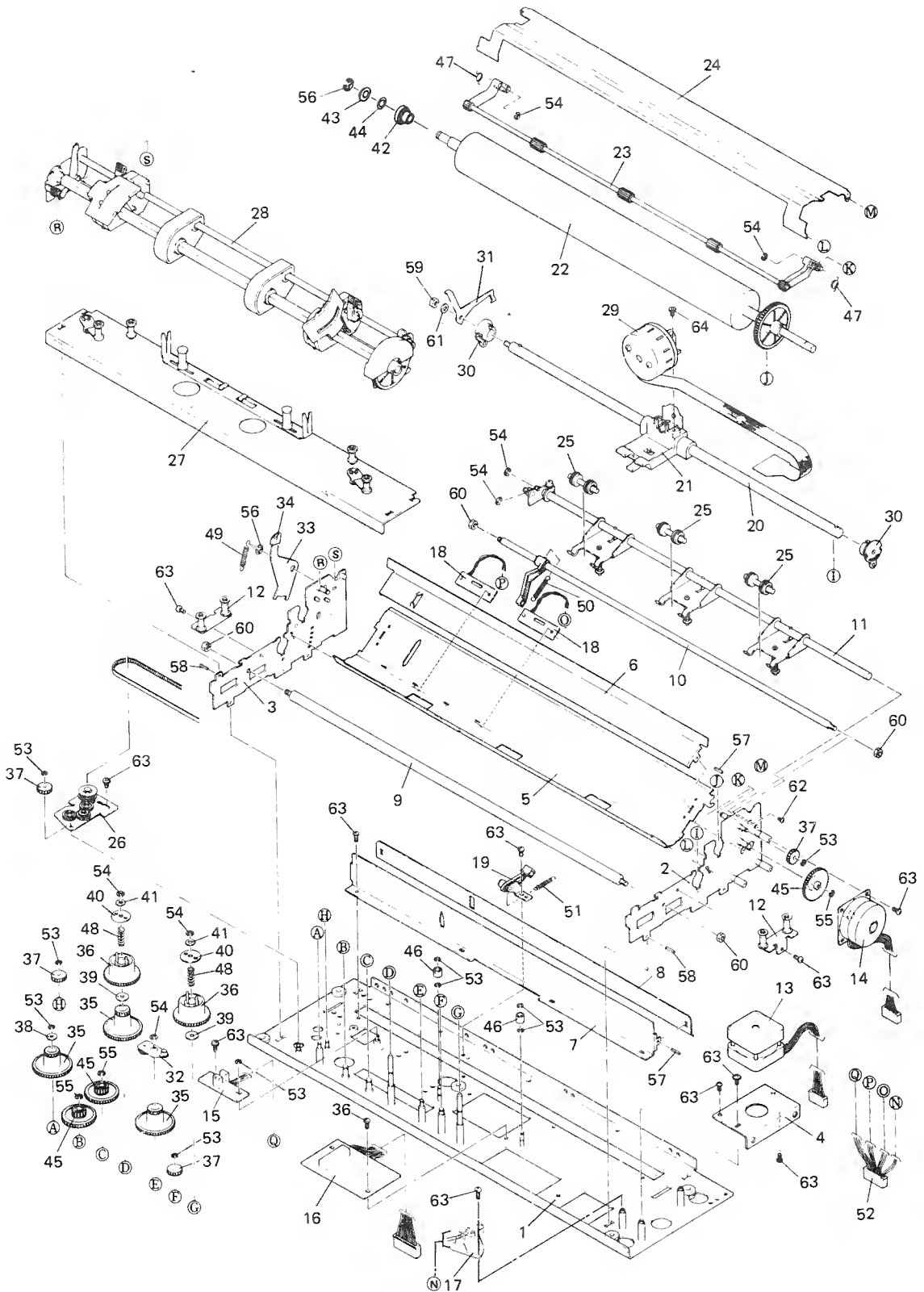
REF. NO.	PART NO.	DESCRIPTION
1	87050311	Frame Base Assembly
2	87040310	Frame R Assembly
3	87040320	Frame L Assembly
4	82090151	Motor Holder
5	82910420	Paper Chute
6	82910430	Sub-Paper Chute
7	82910440	Bottom Paper Chute
8	82910450	Bottom Sub-Paper Chute
9	81370170	Carriage Stay
10	87050340	Frame Stay Assembly
11	87050350	Roller Holder Assembly
12	87049010	Ribbon Roller Assembly
13	87041011	Carriage Motor (M1)
14	87041020	Paper Feed Motor (M2)
15	87055030	Home Position Detector Board
16	87055010	Head Cable Board
17	87059040	Right-End Detector Unit
18	87055041	Paper-Out Detector Board
19	87050360	Bottom Detector Assembly
20	87059030	Carriage Stay (1) Assembly
21	87052010	Carriage Assembly
22	87053010	Platen Assembly
23	87059020	Ball Roller Assembly
24	82910460	Platen Cover
25	87049020	Pinch Roller Assembly
26	87059010	Adjusting Plate Assembly
27	87054010	Ribbon Base Assembly
28	87056010	Tractor Unit
29	89070010	Print Head (M3)
30	83900170	Adjustment Bushing
31	82400340	Adjustment Lever L
32	87029020	Clutch Lever (1) Assembly
33	82400350	Release Lever
34	83900260	Release Cap

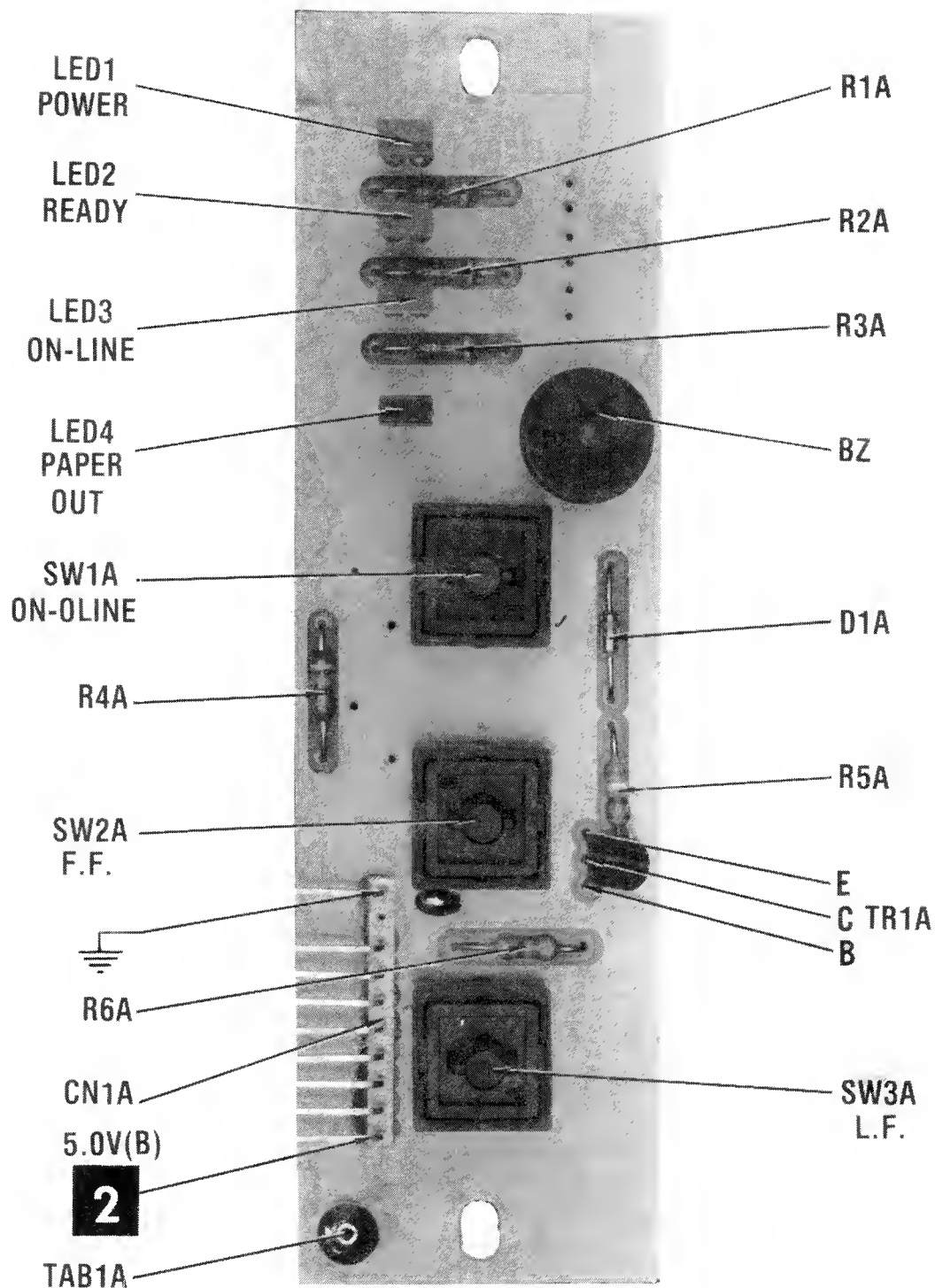
REF. NO.	PART NO.	DESCRIPTION
35	83100120	Idler Gear (1)
36	83120050	Spool Gear
37	83100110	Gear
38	82200010	Collar (1)
39	83200310	Spool Collar
40	82900090	Spring Weight
41	02304050	Thrust Collar
42	83200090	Bushing
43	82500200	Wave Washer (5)
44	02307050	Poly-Slider
45	83100100	Idler Gear (2)
46	83200160	Sub-Roller
47	80530170	Paper Holder Spring
48	80520091	Spool Spring
49	80510280	Release Spring
50	80510240	Paper-Out Detector Spring
51	80510300	Bottom Detector Spring
52	09100087	Connector Housing 5208 - 10
53	04020010	Stop Ring E2
54	04020015	Stop Ring E3
55	04020016	Stop Ring E4
56	04020017	Stop Ring E5
57	04012002	Roll Pin SP2 - 10
58	04012501	Roll Pin SPP2.5 - 10
59	02010401	Nut N4
60	02040401	Spring Nut N4
61	02110401	Notched Washer WB4
62	01902018	Tapping Screw M2 x 4
63	01903018	Screw with Notched Washer M3 x 6
64	01903038	Tapping Screw with Washer M3 x 10
	04991204	Fastener

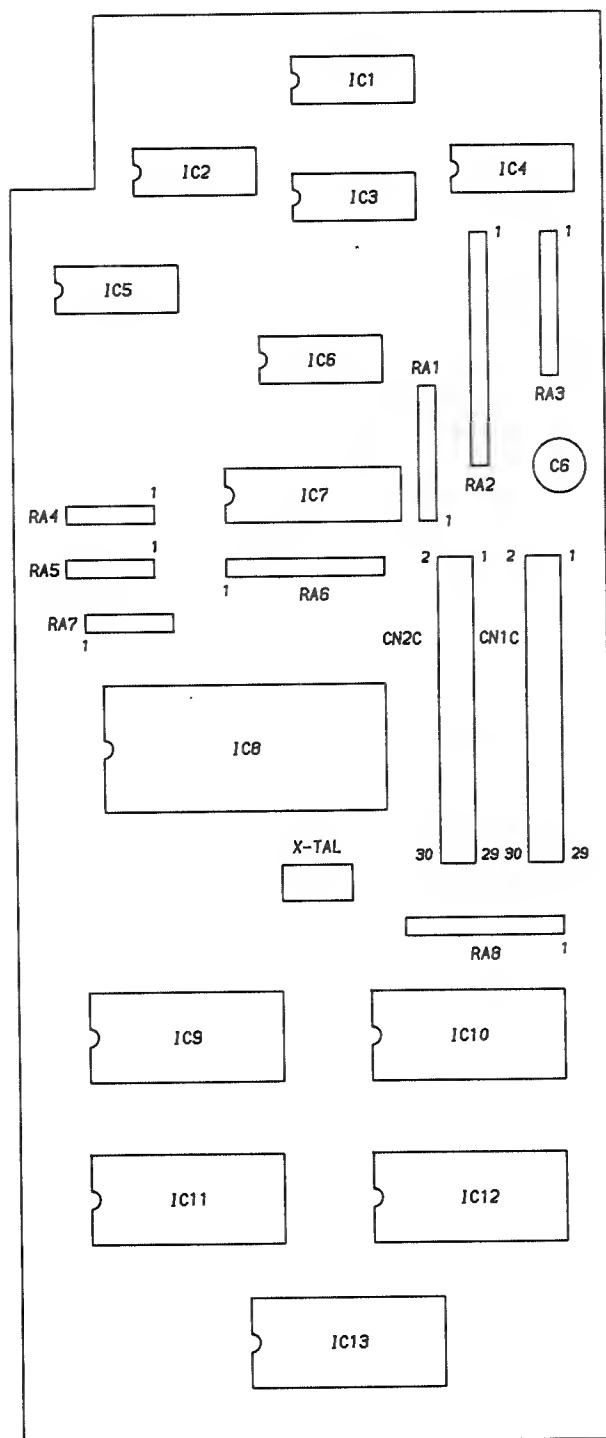
STAR  
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# PARTS LIST AND DESCRIPTION SERIAL INTERFACE BOARD / 4K/8K BUFFER BOARD

When ordering parts, state Model, Part Number, and Description

## SEMICONDUCTORS (Select replacement for best results)

ITEM No.		TYPE No.	MFGR. PART No.	REPLACEMENT DATA					
				NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
SERIAL INTERFACE BOARD									
D1,2	1S1588		08000001		NTE519	ECG519	SK3100/519	WEP925/519	103-131
IC1	75188		08210047		NTE75188	ECG75188	SK5188/75188		HE-443-794
IC2	75189		08210048		NTE75189	ECG75189	SK5189/75189		HE-443-795
IC3	74LS04		08210002		NTE74LS04	ECG74LS04	SK74LS04		HE-443-755
IC4	79L12		08200064		NTE1903	ECG1903	SK9221/1903		
IC5	78L12		08200045		NTE964	ECG964	SK3630/964	WEP2289/964	HE-442-691
4K/8K BUFFER BOARD									
IC1	74LS74		08210033		NTE74LS74A	ECG74LS74A	SK74LS74A		HE-443-730
IC2 (IC6)	74LS14		08210023		NTE74LS14	ECG74LS14	SK74LS14		HE-443-872
IC3 (IC2)	74LS32		08210053		NTE74LS32	ECG74LS32	SK74LS32		HE-443-875
IC4	74LS05		08210017		NTE74LS05	ECG74LS05	SK74LS05		HE-443-818
IC5 (IC3)	74LS08		08210032		NTE74LS08	ECG74LS08	SK74LS08		HE-443-780
IC6 (IC5)	74LS42		08210004		NTE74LS42	ECG74LS42	SK74LS42		HE-443-807
IC7	74LS374		08210052		NTE74LS374	ECG74LS374			HE-443-863
IC8 (IC10)	2732D		88940010 (2)		NTE2732 (12)	ECG2732 (12)			
IC9 (IC13)	4016CX		08220031						
IC10 (IC12)	4016CX		08220031						
IC11	4016CX		08220031						
IC12 (IC9)	4016CX		08220031						
IC13 (IC8)	uPD7800		08220029						

Callouts in ( ) used in 4K/8K Buffer Board with Crystal X-TAL.

- (2) For Gemini series.  
(12) Programming Required.



# PARTS LIST AND DESCRIPTION SERIAL INTERFACE BOARD

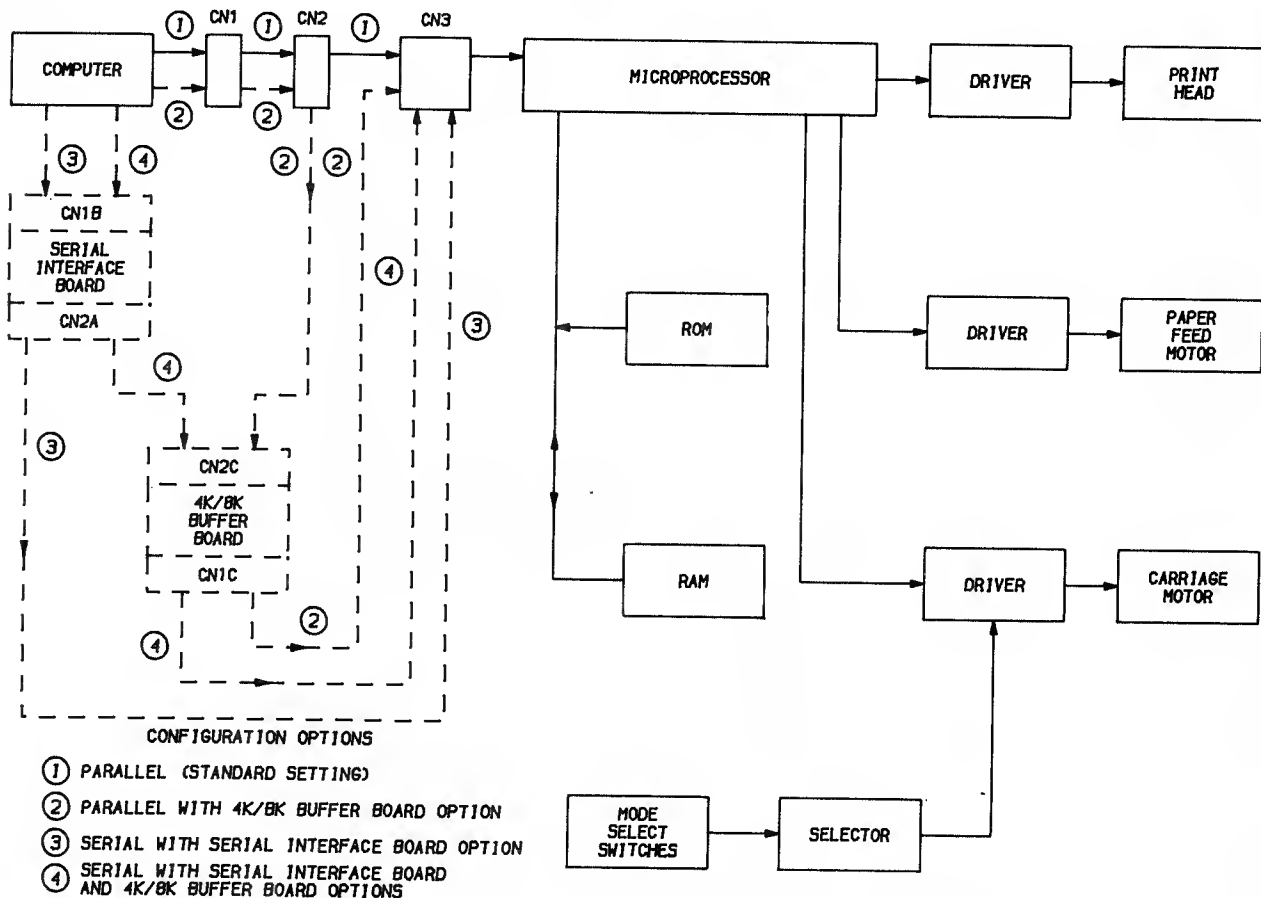
**/4K/8K BUFFER BOARD (Continued)** When ordering parts, state Model, Part Number, and Description  
**RESISTORS (Power and Special)**

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
	<b>4K/8K BUFFER BOARD</b>			
RA1	Resistor Network (1)	06584725		
RA2	Resistor Network (2)	06581031		
RA3	Resistor Network (3)	06584723		
RA4	Resistor Network (4)	06581032		
RA5	Resistor Network (2)	06581031		
RA6	Resistor Network (5)	06581531		

- (1) 4700, 11 Element. (4) 10K, 8 Element.  
 (2) 10K, 4 Element. (5) 15K, 8 Element.  
 (3) 4700, 8 Element.

## MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
DSW	DIP Switch	09090009	KTD08
<b>4K/8K BUFFER BOARD</b>			
X-TAL	Crystal		

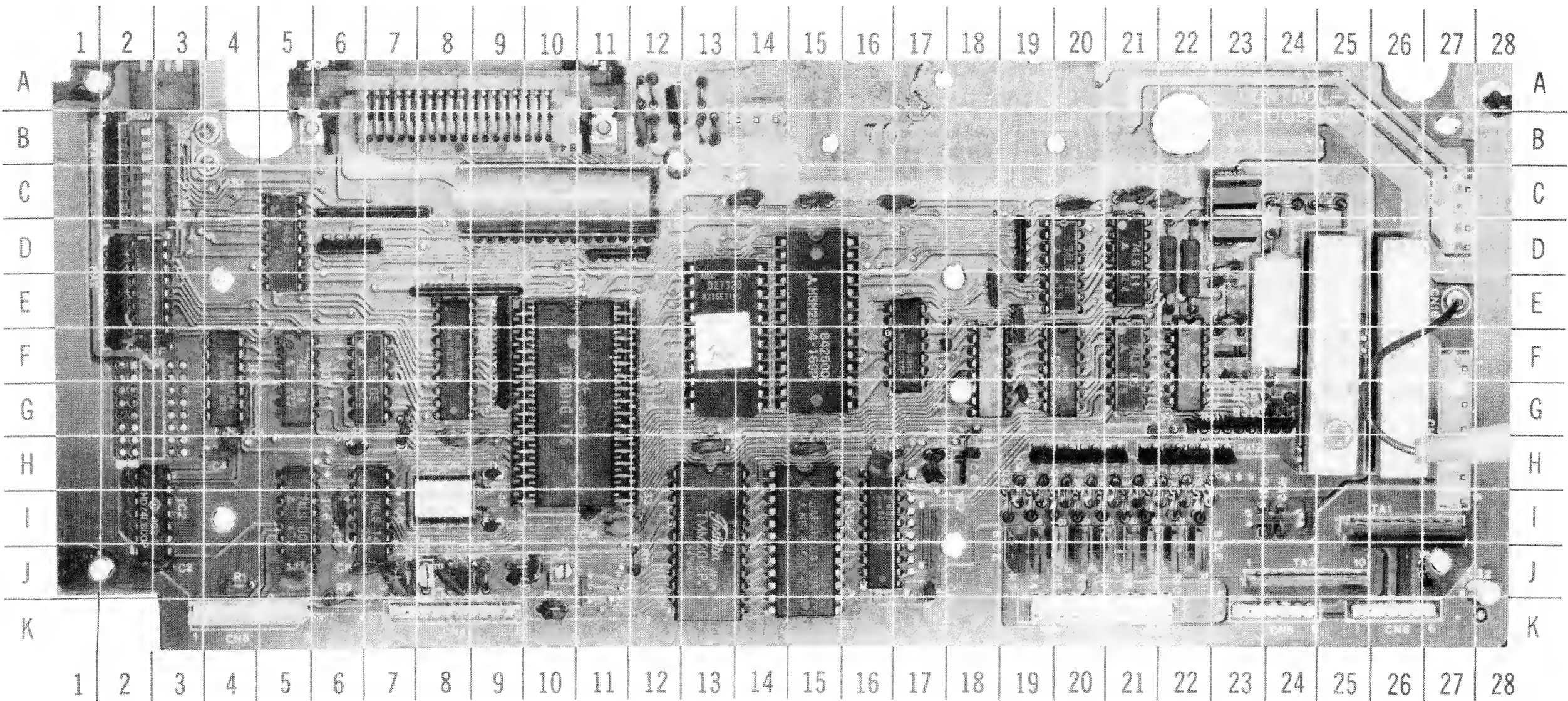


## BLOCK DIAGRAM

CONTROL LOGIC BOARD GridTrace LOCATION GUIDE

C1	F-3	C17	B-12	C33*	D-22	D4	H-19	D20	H-22	IC12	F-13	R5	J-8	R21	D-22	RA3	G-7	TR3	J-19
C2	J-3	C18	C-14	CN1	A-8	D5	I-19	D21	I-24	IC13	I-13	R6	J-9	R22	G-21	RA4	D-6	TR4	J-19
C3	H-4	C19	H-13	CN2	C-10	D6	H-19	D22	C-25	IC14	E-15	R7	J-9	R23	D-23	RA5	E-8	TR5	J-20
C4	H-4	C20	C-15	CN3	D-10	D7	I-20	DSW1	C-2	IC15	I-15	R8	J-10	R24	E-23	RA6	F-9	TR6	J-20
C5	J-5	C21	H-15	CN4	K-8	D8	H-20	DSW2	A-3	IC16	F-17	R9	J-9	R25	E-23	RA7	D-11	TR7	J-21
C6	H-6	C22	C-17	CN5	K-24	D9	H-20	IC1	E-2	IC17	I-16	R10	K-10	R26	F-23	RA9	D-19	TR8	J-21
C7	I-6	C23	H-16	CN6	K-26	D10	H-20	IC2	I-2	IC18	F-18	R11	J-12	R27	F-23	RA10	H-20	TR9	J-21
C8	J-7	C24	J-17	CN7	K-20	D11	I-20	IC3	F-4	IC19	E-20	R12	A-12	R28	E-24	RA11	G-23	TR10	J-22
C9	J-7	C25	G-18	CN8	K-4	D12	H-21	IC4	D-5	IC20	F-20	R13	B-12	R29	G-24	RA12	H-22	TR11	J-22
C10	H-8	C26	E-18	CN13	B-14	D13	I-21	IC5	F-5	IC21	D-21	R14	A-13	R30	G-24	TA1	I-26	TR12	C-23
C11	H-9	C27	E-19	CN14	C-27	D14	H-21	IC6	I-5	IC22	F-21	R15	B-15	R31	I-24	TA2	J-24	TR13	D-23
C12	I-9	C28	G-19	CN15	G-27	D15	I-21	IC7	F-7	IC23	F-22	R16	F-18	R32	I-24	TAB1	B-4	TR14	F-23
C13	J-8	C29	C-20	CN16	E-27	D16	H-22	IC8	I-7	R1	J-4	R17	H-17	R33	F-25	TAB2	B-4		
C14	I-11	C30	C-21	D1	A-12	D17	I-22	IC9	F-8	R2	G-7	R18	H-17	R34	F-26	TAB3	A-28		
C15	I-11	C31	C-22	D2	B-13	D18	H-22	IC10	G-11	R3	K-6	R19	H-18	RA1	C-2	TR1	J-8		
C16	B-12	C32	J-28	D3	I-19	D19	I-22	IC11	A-12	R4	J-7	R20	D-22	RA2	E-2	TR2	H-18		

\* Located on other side of board.



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# GENERAL OPERATING INSTRUCTIONS

## PRINTER SELF-TEST

To use the built-in self-test function, put paper into the Printer and hold down the LF (Line Feed) button while turning the Printer On.

When the Printer is turned On, it is "On-Line". pressing the "On-Line" button changes the status of the Printer from "On-Line" to "Off-Line". When the Printer is "On-Line", the Ready light and "On-Line" light will be On. These lights will turn Off when the status of the Printer changes to "Off-Line".

## DIP SWITCHES

It is necessary to remove Upper Case for access to DIP Switch 1. Access to DIP Switch 2 is at the rear of the Printer.

SW1-1 sets selection of character set. Standard setting is On. See Character Set Table.

SW1-2 sets selection of print mode. For Normal print mode set SW1-2 to On. For Emphasized print mode set SW1-2 to Off.

SW1-3 sets selection of print pitch. For 10 CPI (character per inch) set SW1-3 to On position. For 17 CPI (character per inch) set SW1-3 to Off position.

SW1-4 sets selection of character set. Standard setting is On. See Character Set Table.

## CHARACTER SET TABLE

CHARACTER SET	SW1-1	SW1-4
STANDARD ASCII	On	On
DOWN LOAD	On	Off
ITALIC ASCII	Off	On
ITALIC DOWN LOAD	Off	Off

SW1-5 sets selection of line feed value. For 1/6 inch setting of line feed set SW1-5 to On position. For 1/8 inch setting of line feed set SW1-5 to Off position.

SW1-6, SW1-7 and SW1-8 set selection of International Character Set and form length. See International Character Set Table.

## INTERNATIONAL CHARACTER SET TABLE

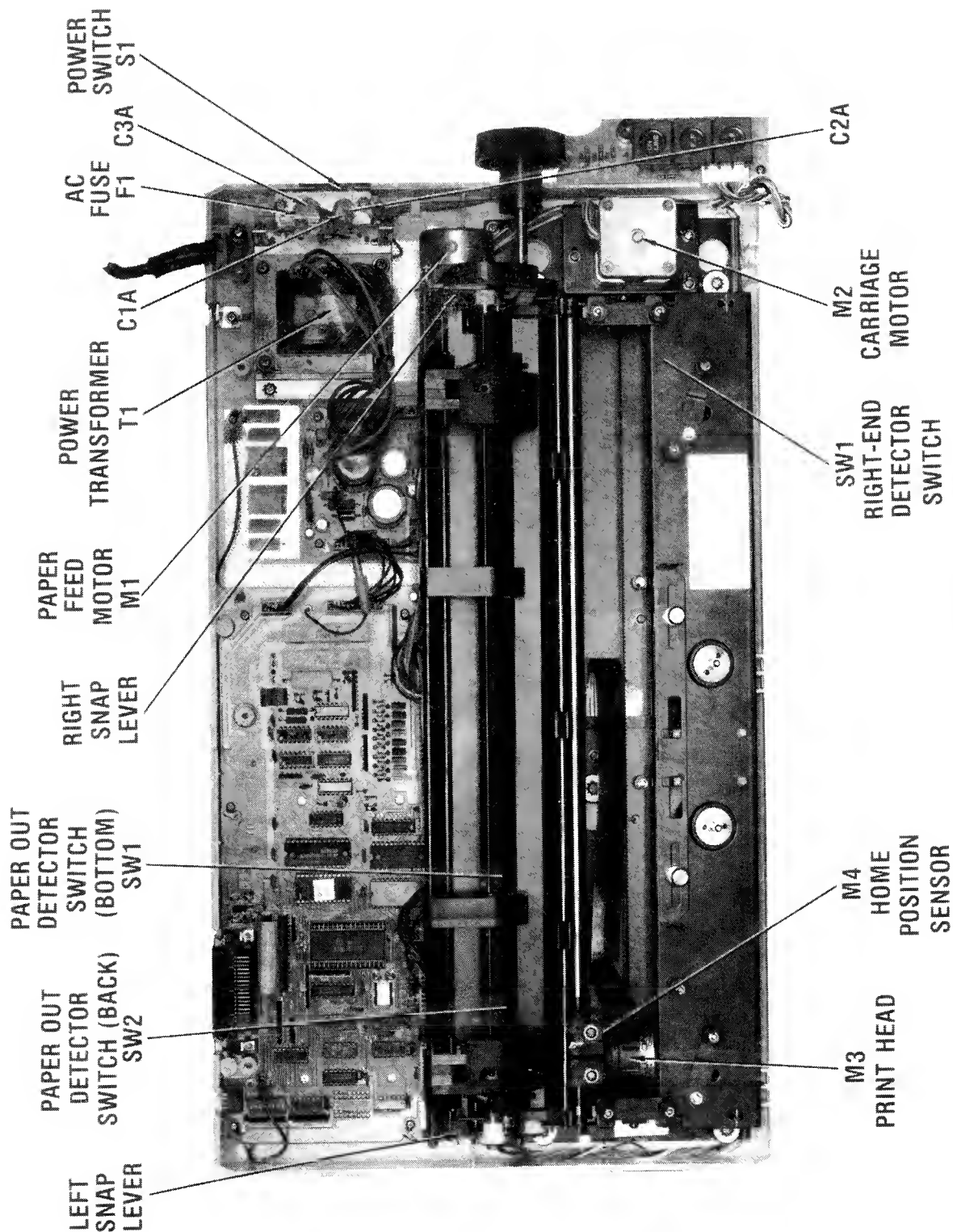
COUNTRY	SW1-6	SW1-7	SW1-8	Form Length
USA	On	On	On	11 inches
England	Off	On	On	11 inches
Germany	On	Off	On	12 inches
France	On	On	Off	12 inches
Denmark	Off	Off	On	12 inches
Sweden	Off	On	Off	12 inches
Italy	On	Off	Off	12 inches
Spain	Off	Off	Off	12 inches

SW2-1 sets the selection of paper out sensor. If SW2-1 is set to On position (standard setting), the Printer is disabled when out of paper, and sends the signal to the host Computer to stop sending more information. If SW2-1 is set to Off position, the Printer is allowed to print without paper in the unit.

SW2-2 sets the selection of the buffer or CR. If SW2-2 is set to On position, CR code is ignored and print data of one line is stored in the buffer until memory is full or by input of LF code. If SW2-2 is set to Off position, printing is performed everytime CR code is input (standard setting).

SW2-3 sets the selection of 7 or 8 Bit interface selection. If SW2-3 is set to On position, interface is set to 7 bits. If SW2-3 is set to Off position, interface is set to 8 bits (standard setting).

SW2-4 sets the Printer auto line feed On or Off. Note that SW2-2 overrides SW2-4. If SW2-4 is set to On position auto line feed is performed by CR code. If SW2-4 is set to Off position auto line feed is not performed by input of CR code (standard setting).



STAR  
GEMINI-15X

CHASSIS-TOP VIEW

## SCHEMATIC NOTES

—\*— Circuitry not used in some versions

--- Circuitry used in some versions

• See parts list

⊕ Ground

Voltages measured with digital meter.

Waveforms and voltages are taken from ground, unless noted otherwise.

Voltages, waveforms and logic readings taken with Printer On and not printing unless noted. Printer self-test mode used to get readings taken while printing. NOTE: ensure the Home Position Sensor (M4) is clear of foreign objects, Print Head Assembly (M3) is at home (extreme left) position, Right-End Detector Switch (SW3) is open and Paper Out Switches (SW1, SW2) are closed.

Switches DSW1 and DSW2 set as shown on schematic.

Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on "0" reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 7.5cm width with DC reference voltage given at the bottom line of each waveform.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltage maintained as shown at input.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value in ( ) used in some versions.

Measurements taken with switching as shown, unless noted.

Logic Probe Display

L = Low

H = High

P = Pulse

\* = Open (No lights On)

(1) Probe indicates P at home position.

(2) Probe indicates H during line feed.

(3) Probe indicates L at home position.

(4) Probe indicates P during line feed.

(5) Probe indicates L during line feed.

(6) Probe indicates P during carriage return.

(7) Logic readings not taken.

## LOGIC CHART

PIN NO.	IC1	IC1B	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9
1	P	(7)	L	*	P	H	L	H	H	H
2	H		H	*	L	L	L	L	L	P
3	H		H	*	L	L	H	H	H	H
4	P		H	*	P	H	L	L	L	H
5	L		H	H	L	H	L	L	P(2)	P
6	H		L	L	L	L	H	H	P	P
7	P		L	L	P	L	L	L	L	H
8	L		H	L	L	L	L	H	H(3)	H
9	P		H	H	P	H	H	L	L	P
10	L		L	H	L	L	H	H	L	L
11	H		L	L	L	H	H	L	H	L
12	P		H	H	P	L	H	H	L	P
13	H		H	H	L	H	L	L	*	H
14	H		H	H	L	H	H	H	H	H
15	H(1)				H(1)					P
16	H				H					P
17										H
18										H
19										P
20										H

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(3) Probe indicates L at home position.

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(5) Probe indicates L during line feed.

(6) Probe indicates P during carriage return.

(7) Logic readings not taken.

# LOGIC CHART (Continued)

PIN NO.	IC10	PIN NO.	IC10	PIN NO.	IC10	PIN NO.	IC10	PIN NO.	IC11	PIN NO.	IC12	IC13
1	P	17	P	33	H(3)	49	P	1	(7)	1	P	P
2	P	18	H	34	H(4)	50	P	2		2	P	P
3	P	19	L	35	L(4)	51	P	3		3	P	P
4	P	20	L	36	H(4)	52	P	4		4	P	P
5	P	21	L	37	H(3)	53	P	5		5	P	P
6	P	22	H	38	P	54	P			6	P	P
7	P	23	L	39	L	55	P			7	P	P
8	P	24	L	40	P	56	P			8	P	P
9	P	25	H	41	P	57	P			9	P	P
10	P	26	H	42	P	58	P			10	P	P
11	H(6)	27	H	43	P	59	P			11	P	P
12	H	28	L	44	H	60	P			12	L	L
13	L	29	H	45	H	61	P			13	P	P
14	H	30	P	46	H	62	P			14	P	P
15	P	31	P	47	H	63	P			15	P	P
16	P	32	L	48	P(3)	64	P			16	P	P
										17	P	P
										18	P	P
										19	P	P
										20	P	P
										21	P	P
										22	P	P
										23	P	P
										24	H	H

PIN NO.	IC14	PIN NO.	IC14	PIN NO.	IC15	IC16	IC17	IC18	IC19	IC20	IC21	IC22	IC23
1	H	15	P	1	P	P	P	*	P	P	H	P	P
2	P	16	P	2	P	P	P	*	P	H	P	P	P
3	P	17	P	3	P	P	P	*	P	H	H	H(5)	H(5)
4	P	18	P	4	P	L	P	H	H	P	H	L(2)	L(2)
5	P	19	P	5	P	L	P	H	P	P	H(6)	L(2)	P
6	P	20	P	6	P	L	P	L	H(4)	P	H(6)	*(5)	L
7	P	21	P	7	P	L	P	L	H	L	L	L	L
8	P	22	P	8	P	H	P	L	L	H(1)	P	*(5)	L
9	P	23	P	9	P	H	P	P	P	P	H	L(2)	P
10	P	24	P	10	P	H	L	H	P	P	H(5)	L	H(5)
11	P	25	P	11	P	P(2)	P	H	H(4)	H	P	P	L(2)
12	P	26	H	12	L	L	P	L	P	P	P	L(2)	P
13	P	27	H	13	H	P	P	L	P	H	H	H(5)	P
14	L	28	H	14	L	H	P	L	P	H	H	H	H
				15	P		P	*	P				
				16	P		P	H	H				
				17	H(6)		P						
				18	P		P						
				19	P		P						
				20	P		H						
				21	H(4)								
				22	P								
				23	P								
				24	H								

Logic Probe Display

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P = Pulse

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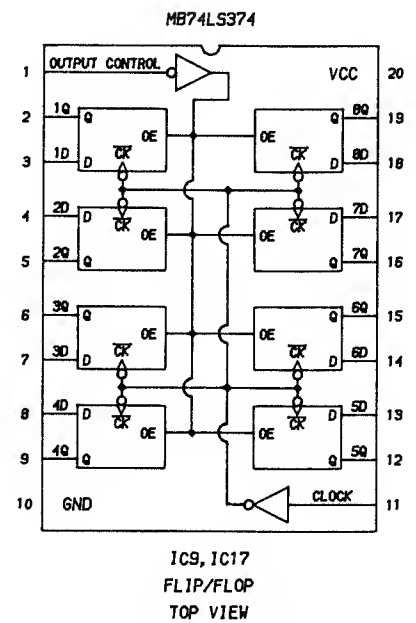
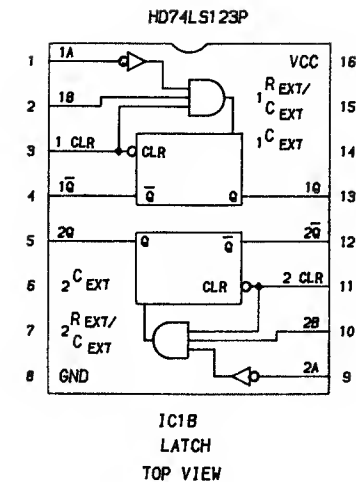
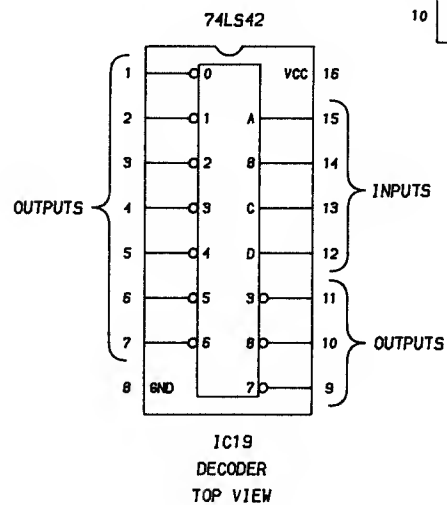
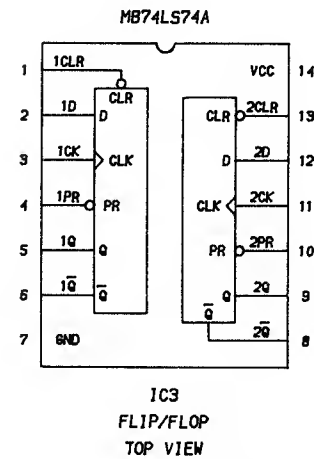
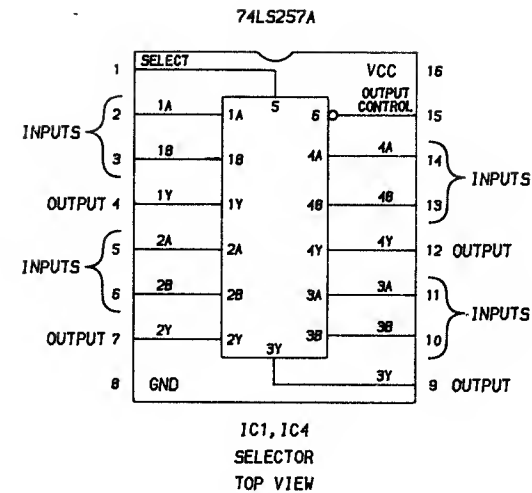
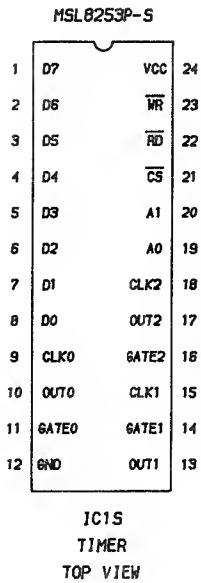
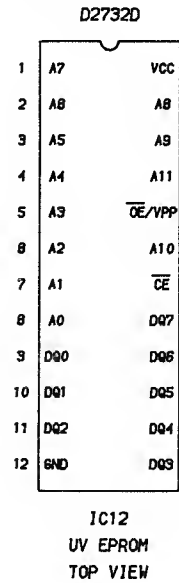
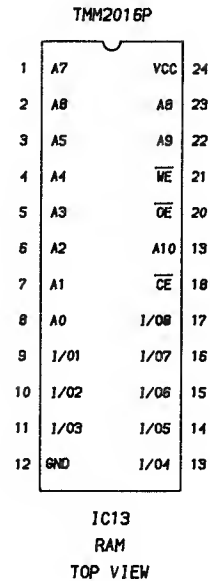
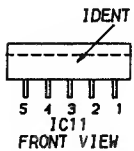
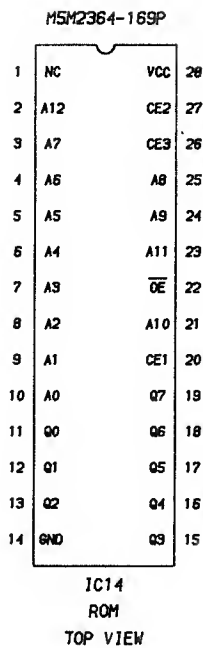
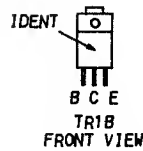
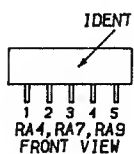
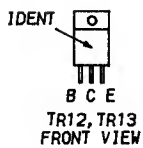
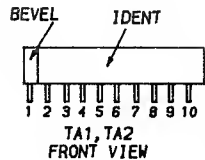
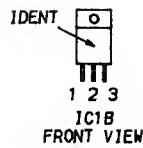
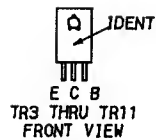
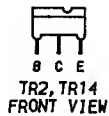
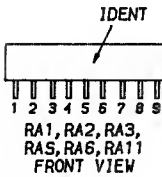
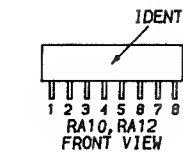
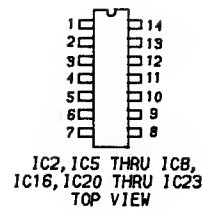
(5) Probe indicates L during line feed.

(6) Probe indicates P during carriage return.

(7) Logic readings not taken.

STAR  
GEMINI-15X

IC PINOUTS & TERMINAL GUIDES

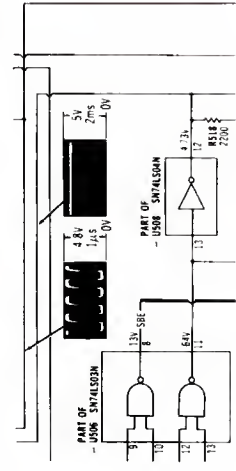






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**TROUBLESHOOTING**

**MICROPROCESSOR CHIP (CPU) OPERATION**

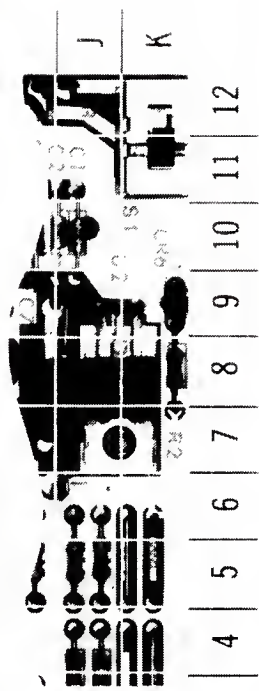
Verify the processor is functioning by checking the signals on the address lines (pins 1 thru 24 of IC U601) and the data lines (pins 25 thru 36 of IC U601). The logic probe is used to verify the correct readings. It is a scope is used to check the waveforms on the address lines (pins 25 and 26) which have no signal in PowerUp mode. The logic probe is used to check the waveforms on the data lines (pins 37 thru 40) to F. G. H. I.

- Logic Chart containing logic probe readings to isolate defective circuitry and components.

**LOGIC**

PIN NO.	IC U100	PIN NO.	IC U100	PIN NO.	IC U101	PIN NO.	IC U102	PIN NO.	IC U103	PIN NO.	IC U104	PIN NO.	IC U105	PIN NO.	IC U106	PIN NO.	IC U107	PIN NO.	IC U108	PIN NO.	IC U109
1	P	21	P	1	L	L	P	1	L	L	P	1	L	L	P	1	L	L	P	1	L
2	P	22	P	2	P	P	P	2	P	P	P	2	P	P	P	2	P	P	P	2	P
3	P	23	P	3	H	H	H	3	H	H	H	3	H	H	H	3	H	H	H	3	H

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

**SEMICONDUCTORS (Select replacement for best results)**

ITEM No	TYPE No	MFR PART No	EGS PART No	GENERAL ELECTRIC PART No	MOTOROLA PART No	NTE PART No	RCA PART No	WORKMAN PART No	ZENITH PART No
0102	15553	1149-2576	EGS109	GE-514	1N4935	NTE519	SK9091/177	MEP925/519	103-131
0103	1N607M	1149-2527	EGS109	1N60	1N4935	NTE109	SK3088	MEP134/109	103-29001
0501	1N4935	1149-2527	EGS109	GE-514	1N4935	NTE116	SK3312	MEP157	212-78-02
0503	15553	1149-2576	EGS109	GE-514	1N4935	NTE519	SK9091/177	MEP925/519	103-131

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